



**NIH SciEd 2022**  
**Annual Conference for NIH**  
**Science Education Projects**

Grand Hyatt Washington at Metro Center  
1000 H Street NW, Washington, DC  
May 31 – June 3, 2022

# Conference Program Overview

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WiFi Access Code: SCIED2022

WiFi Network: hyatt\_meeting

Conference Evaluation:

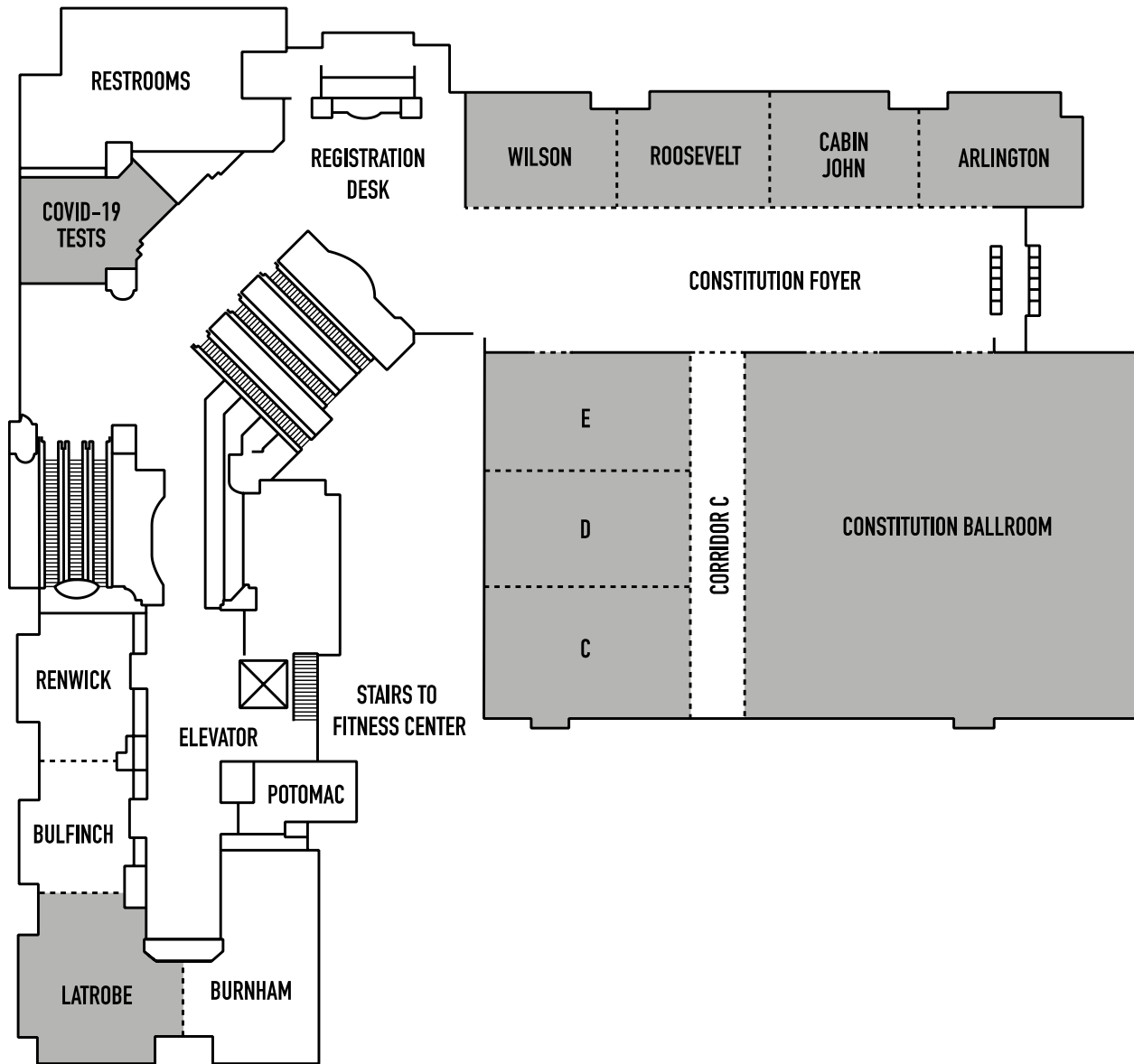
[https://utah.sjc1.qualtrics.com/jfe/form/SV\\_8f7ERd0oScUdgiQ](https://utah.sjc1.qualtrics.com/jfe/form/SV_8f7ERd0oScUdgiQ)

Twitter: #SCIED2022

## Conference Support

Partial funding for this conference was provided by the National Institute of General Medical Sciences of the National Institutes of Health under Award Number 1R13GM143826-01. The views expressed in written conference materials or publications and by speakers and moderators do not necessarily represent the official views of the National Institutes of Health; nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

CONSTITUTION LEVEL (3B)



# Pandemic Precautions

- Covid antigen testing required before entering the conference space
  - Conference attendees are required to provide a negative antigen test before entering the conference space for the first time and 2 days later
    - Attendees who tested on Tuesday, need to test again on Thursday morning
    - Attendees who tested on Wednesday, need to test again on Friday morning
  - Additional tests are available on request from the conference registration desk
- Masking strongly encouraged
  - All attendees are strongly encouraged to wear a N95 or KN95 mask whenever they are in the conference meeting space (except when they are eating/drinking)
  - Masks are available at the conference registration desk
- Touching
  - Attendees are encouraged to refrain from hugging or shaking hands
  - Instead, do elbow or shoulder bumps
- Eating
  - Attendees may choose to eat in the plenary room, in breakout rooms, or in their hotel room
  - If you eat somewhere other than the plenary room, please bring your table service items back to the used-item trays in the buffet area
- Hand sanitizer
  - Sanitizer is provided with your conference materials; please use it frequently

# Conference Code of Conduct

Each person's attendance and contributions are valued for this conference. Together, we strive to have a positive and productive experience for everyone through an open exchange of ideas in a professional setting. Attitudes and behaviors that support this goal include:

- Be fully present when others are speaking, listening thoughtfully
- Be respectful of differing points of view
- Be mindful of how frequently you contribute to the discussion, allowing time for others to share
- Be concise, constructive and meaningful when you speak
- Examine your assumptions and perceptions
- Be curious
- Laugh and enjoy each other

The Conference Organizing Committee will not tolerate behaviors that create an uncomfortable or unsafe space for anyone. Unacceptable behaviors will result in a request to leave the conference. These behaviors include, but are not limited to:

- Harmful or prejudicial verbal or written comments or visual images
- Harassment, intimidation, or discrimination in any form
- Disruption of presentations during sessions

Anyone who experiences these or other unacceptable behaviors is asked to report them to Louisa Stark, SciEd 2022 Conference Organizing Committee Chair, either in-person or via email at [louisa.stark@utah.edu](mailto:louisa.stark@utah.edu). Unacceptable behaviors may also be reported to any member of the Conference Organizing Committee.

# Conference Organizing Committee

## Conference Chair

Louisa A. Stark, PhD, H.A. and Edna Benning Presidential Endowed Chair, Professor of Human Genetics, and Director, Genetic Science Learning Center, University of Utah School of Medicine; [louisa.stark@utah.edu](mailto:louisa.stark@utah.edu)

## Broadening Participation Strand

Luke Bradley, PhD, Professor of Neuroscience and of Molecular and Cellular Biochemistry, University of Kentucky; [lhbradley@uky.edu](mailto:lhbradley@uky.edu)

Maurice Godfrey, PhD, Professor, Munroe-Meyer Institute, University of Nebraska Medical Center; [mgodfrey@unmc.edu](mailto:mgodfrey@unmc.edu)

Debra Yourick, PhD, Director, Science Education and Fellowship Programs, Walter Reed Army Institute of Research; [debra.l.yourick.civ@mail.mil](mailto:debra.l.yourick.civ@mail.mil)

## Curriculum Development Strand

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Daniel Fernandez, PhD, Professor of Applied Environmental Science, California State University, Monterey Bay; [dfernandez@csumb.edu](mailto:dfernandez@csumb.edu)

Carla Romney, DSc, MBA, Boston University School of Medicine; [romney@bu.edu](mailto:romney@bu.edu)

## Informal Science Education Strand

Julia McQuillan, PhD, Willa Cather Professor of Sociology, University of Nebraska, Lincoln; [jmcquillan2@unl.edu](mailto:jmcquillan2@unl.edu)

Bonnie Sachatello-Sawyer, Executive Director, Hopa Mountain; [bsawyer@hopamountain.org](mailto:bsawyer@hopamountain.org)

## Interactive Multimedia for STEM Learning Strand

Berri Jacque, PhD, Associate Professor of Medical Education, Tufts University School of Medicine; [berri.jacque@tufts.edu](mailto:berri.jacque@tufts.edu)

James Lester, PhD, Distinguished University Professor of Computer Science, and Director, Center for Educational Informatics, North Carolina State University; [lester@ncsu.edu](mailto:lester@ncsu.edu)

## Project Administration Strand

Bethany Hornbeck, President, Apis Creative; [bhornbeck@apiscreative.com](mailto:bhornbeck@apiscreative.com)

J. Michael Wyss, PhD, Professor and Director, Center for Community Outreach Development, University of Alabama at Birmingham; [jmwys@uab.edu](mailto:jmwys@uab.edu)

## Conference Organizing Committee (cont)

### Research and Evaluation Strand

Alana Newell, PhD, Assistant Professor of Education, Innovation and Technology, and Center for Educational Outreach, Baylor College of Medicine; [adnewell@bcm.edu](mailto:adnewell@bcm.edu)

Loran Carleton Parker, PhD, Associate Director, Senior Research and Evaluation Associate, Evaluation & Learning Research Center, Purdue University; [carleton@purdue.edu](mailto:carleton@purdue.edu)

### Research Experiences for Students and Teachers Strand

Robin Fuchs-Young, PhD, Professor of Molecular and Cellular Medicine, Texas A&M University; [fuchs-young@tamu.edu](mailto:fuchs-young@tamu.edu)

Derrick Scott, PhD, Associate Professor of Biology and Executive Director, Molecular Diagnostics Laboratory, Delaware State University; [dcscott@desu.edu](mailto:dcscott@desu.edu)

Tony Ward, PhD, Professor and Chair, School of Public and Community Health Sciences, University of Montana; [tony.ward@mso.umt.edu](mailto:tony.ward@mso.umt.edu)

### Science Teaching and Learning Strand

Kristin Bass, PhD, Director of Research Development, Rockman et al; [kristin@rockman.com](mailto:kristin@rockman.com)

Renee Bayer, MHSA, Associate Director for Engagement, CREATE for STEM Institute, Michigan State University; [rbayer@msu.edu](mailto:rbayer@msu.edu)

### Teacher Professional Development Strand

Virginia Stage, PhD, RDN, LDN, Associate Professor of Nutrition Science, East Carolina University; [carrawaystagev@ecu.edu](mailto:carrawaystagev@ecu.edu)

Carmela Amato-Wierda, PhD, Associate Professor of Materials Science, University of New Hampshire; [ccaw@unh.edu](mailto:ccaw@unh.edu)

Sarah Wojiski, PhD, Director of Education, The Jackson Laboratory; [sarah.wojiski@jax.org](mailto:sarah.wojiski@jax.org)

### Ex Officio Members: NIH Program Officers

Tony Beck, PhD, Program Director, Science Education Partnership Award (SEPA), Interactive Digital Media STEM SBIR/STTR, Division for Research Capacity Building, NIH National Institute of General Medical Sciences; [beckl@mail.nih.gov](mailto:beckl@mail.nih.gov)

Belem López, PhD, Program Director, Youth Enjoy Science Research Education Program, Diversity Training Branch, Center to Reduce Cancer Health Disparities, NIH National Cancer Institute; [belem.lopez@nih.gov](mailto:belem.lopez@nih.gov)

# Conference Schedule

## Tuesday, May 31

- 4:00-6:00      **Covid-19 antigen testing**
1. Pick up your Covid antigen tests at a table in the hotel lobby, near the escalator down to the Declaration Level
  2. Carry out your Covid test
  3. Submit your completed test cassette at the table, before entering the conference space
- 4:00-6:00      **Conference Check-in**  
*Grand Foyer (Declaration Level, 1B)*
- 5:00-7:00      **Networking Session**  
*Grand Foyer (Declaration Level, 1B)*

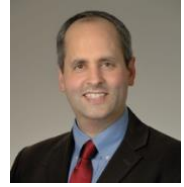
## Wednesday, June 1

***All sessions meet in Constitution Ballroom A/B, unless otherwise noted.***

- 7:15-8:30      Breakfast and Poster Set-up for Poster Session 1
- 7:15-8:30      **Covid-19 antigen testing**
1. Pick up your Covid antigen tests at the conference registration desk, Constitution Level, if you did not test on Tuesday
  2. Carry out your Covid test in one of the designated Covid-testing rooms
  3. Submit your completed test cassette at the registration desk, before entering the main conference space
- 7:30-8:30      Conference Check-in  
*Registration Desk, Constitution Foyer*
- 8:30-8:45      **Welcome**  
*Louisa A. Stark, PhD, Chair, NIH SciEd 2022 Conference Organizing Committee, Professor of Human Genetics and Director, Genetic Science Learning Center, University of Utah*
- 8:45-8:55      **Introduction of Dr. Jon R. Lorsch**  
*[Tony Beck](#), PhD, Program Director, Science Education Partnership Award (SEPA), Division for Research Capacity Building, National Institute of General Medical Sciences (NIGMS), NIH*



8:55-9:30 **Keynote Address: NIGMS Update**  
[Jon R. Lorsch](#), PhD, Director, National Institute of General Medical Sciences (NIGMS), NIH



9:30-9:50 **Update on the NIGMS Science Education Partnership Award (SEPA) Program**  
[Tony Beck](#), PhD, Program Director, Science Education Partnership Award (SEPA), Division for Research Capacity Building, National Institute of General Medical Sciences (NIGMS), NIH



9:50-10:10 **Update on the NCI Youth Enjoy Science Research Education Program**  
[Belem López](#), PhD, Program Director, Diversity Training Branch, Center to Reduce Cancer Health Disparities, National Cancer Institute (NCI), NIH



10:10-10:30 Break

10:30-10:45 **Flash Talks for Roundtables**

10:45-12:00 **Roundtables** (2 rounds of 30 minutes each with 5 minutes between rounds)

Broadening Participation

1. Co-designing Youth Outreach with Youth Partners – *Priya Mohabir, Laycca Umer*
2. Data Sonification – *Luke Bradley*
3. Termighty Guts, Version 2.0 – *Holly Brown, Kathleen Umayam*

Curriculum Development

4. Using Storylines to Align SEPA Projects with the NRC framework and the NGSS – *Ralph Imondi*

Informal Science Education

5. VENOM-venture/A-VENENO-tura: Learning in an Immersive, High-Motivation Serious Game for Families in Informal Environments – *Lisa White, Teresa MacDonald*
6. Working Without a Protocol: Supporting Participants Through Experimental Uncertainty – *Caitlin Nealon*

Research and Evaluation

7. Creating a Learning Assessment System to Evaluate Curriculum Efficacy – *Ang Chen*
8. Developing and Disseminating a SEPA Project's Results and Material – *Linda Morell, Katherine Nielsen, Michelle Phillips*

Research Experiences for Students and Teachers

9. Rural and Indigenous Student Engagement in Biomedical Science and Research: Culture, Place, and Perspective – *Jan Straley, Ellen Chenoweth, Paul Cotter, Aklei Helen Dangel*

Science Teaching and Learning

10. Conceptual Model Building: Developing Understanding through Revision & Collaboration – *Regina Wu, Jeanne Chowning, Kristen Bergsman*
11. Designing Brain-based Informed Positive Impact Learning Environments – *Melanie Duffrin*
12. What can you do with 22 minutes? Exploring ESTA's Litterati Efforts for 22 in 22 on 22 – *Corin Slown, Viviana Vigil, Eros Gonzalez-Lopez, Kenneth Tran, Kariya Hunter, Dan Fernandez, Enid Ryce, Amir Attia, Brenda Eskenazi, Asa Bradman*
13. Resources to Engage and Inform Students About the Health Effects of Vaping – *William Folk*

#### Teacher Professional Development

14. Creating a Multi-institutional Course Collaborative for Middle and High School Teachers – *Nathan Vanderford and Louisa Stark*

12:00-1:15 Lunch

1:15-1:45 **Keynote Address: The [All of Us Research Program](#)**  
*Romuladus E. Azuine, DrPh, MPH, RN, Director of Research Platforms, All of Us Research Program*



1:45-2:00 Break

2:00-3:15 **Concurrent Breakout Sessions**

#### **Let's party like it's 2019! Broadening Participation through Data Parties**

*Kristin Bass, Alison Allen*

*Strand: Broadening Participation – Training Session*

*Room: Roosevelt/Wilson*

#### **Engaging Students and Teachers with the Big Data from the All of Us Research Program**

*Rubin Baskir, Louisa Stark, Yong Crosby*

*Strand: Curriculum Development*

*Room: Ballroom D*

#### **Themed Session: Informal Science Education**

*(20 minutes/presentation, including Q&A)*

*Room: Latrobe*

- Community Listening Sessions: Inviting Community Participation in Exploring Racially Inequitable Health Outcomes and Public Health Careers – *Laycca Umer, Priya Mohabir*
- Bicultural & Bilingual Co-development for Informal Science Education Projects – *Cecilia Nguyen*
- Puzzling out Ancient DNA Stories: Lessons from Developing an Unplugged Bioinformatics Activity – *Abbey Thompson*

- Assessing Cancer Literacy and Risk Behaviors among Appalachian Kentuckians through an Oral History Approach – *Courtney Martin*

**Game Design for Systems Thinking**

*Ailea Stites*

*Strand: Interactive Multimedia for Learning*

*Room: Ballroom C*

**Using the Better Evaluation Rainbow Framework to Improve the Quality of SEPA Evaluations**

*Alana Newell, Loran Carleton Parker*

*Strand: Research & Evaluation – Training Session*

*Room: Arlington/Cabin John*

**Promoting Computational Thinking through Neuroscience & Engineering Design Activities**

*Ido Davidesco*

*Strand: Science Teaching and Learning*

*Room: Ballroom E*

- 3:15-3:30 Break
- 3:30-4:00 **Flash Talks for Poster Session 1**
- 4:00-5:00 **Poster Session 1**  
Remove posters at the end of the session

**Thursday, June 2**

- 7:15-8:30 Breakfast and Poster Set-up for Poster Session 2
- Covid-19 antigen testing if you tested on Tuesday**
  1. Carry out a Covid antigen test in your hotel room
  2. Submit your completed test cassette at the registration desk, before entering the main conference space
- Meeting for New SEPA PIs and Individuals Interested in Applying for a SEPA Grant**  
*Tony Beck, PhD, Program Director, Science Education Partnership Award (SEPA), Division for Research Capacity Building, National Institute of General Medical Sciences (NIGMS), NIH*  
*Room: Arlington/Cabin John*
- 8:30-10:00 **STEM+Medicine (STEM+M) Session**

**Keynote Address: Cultural Institutions as Allies**

[Carla Easter](#), PhD, Broh-Kahn Weil Director of Education, Department of Education Outreach and Visitor Experience, Smithsonian National Museum of Natural History



**World Café Discussion of STEM+M Priorities and Opportunities**

Nancy Moreno, PhD, Professor and Chair, Department of Education, Innovation & Technology, Baylor College of Medicine  
Alana Newell, PhD, Assistant Professor, Department of Education, Innovation & Technology, Baylor College of Medicine

10:00-10:15 Break

10:15-11:30 **Concurrent Breakout Sessions**

**Pandemic Lessons Learned: Stories from the SciEd Community**

Anjan Nan, Molly McAndrew, Luke Bradley, Debra Yourick, Brittany Swift, Nico Ekanem,  
Strand: Broadening Participation  
Room: Latrobe

**Using Seminars to Discuss Health Inequities in the Science Classroom**

Jeanne Chowning, Regina Wu  
Strand: Curriculum Development; Broadening Participation – Curriculum Training Workshop  
Room: Ballroom C

**How to Develop Science and Health Outreach Stories for All Ages**

Susan Gertz, Lauren Bates  
Strand: Informal Science Education  
Room: Ballroom E

**Stories from the Field: A Panel Discussion on SEPA Project Replication**

David H. Holben and Melani Duffrin; Monica Strada and Jane Disney; Amber Cesare and Tim Herman; Robin Bartlett and Ann Chester  
Strands: Informal Science Education, Project Administration,  
Room: Roosevelt/Wilson

**Professional Writing Groups: How to Start and Maintain a Collaborative (and Fun) SciEd Writing Group to Support Project Dissemination**

Renee Bayer, Kristin Bass  
Strands: Research and Evaluation; Project Administration – Training Session  
Room: Arlington/Cabin John

**Systems Thinking Applications Across Multiple Distinct Fields**

Daniel Fernandez, Beth Callaghan, Corin Slown, Enid Ryce  
Strand: Science Teaching and Learning

Room: Ballroom D

11:30-12:30 Lunch

**Diabetes, Obesity and Cardiovascular (DOC) Group meeting**

*Melani Duffrin, Virginia Stage (organizers)*

*Room: Arlington/Cabin John*

12:30-12:45

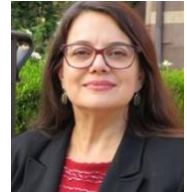
**Report on World Café STEM+M discussions**

*Nancy Moreno, PhD, Chair, Department of Education Innovation and Technology, Baylor College of Medicine*

12:45-1:45

**Keynote Address: Deaf Flourishing and Well-Being: Inclusion and Equity**

[Teresa Blankmeyer Burke](#), PhD, Professor of Philosophy and Bioethics, Gallaudet University



1:45-2:00

Break

2:00-3:15

**Concurrent Breakout Sessions**

**Best Practices for Engaging Members of the Deaf Community in Science Education Programs: An Informal Discussion with Teresa Blankmeyer Burke, PhD**

*Teresa Blankmeyer Burke (Facilitator: Louisa Stark)*

*Strand: Broadening Participation*

*Room: Ballroom D*

**Engaging Different Audiences in the Importance of Genetics and Genomics**

*Maurice Godfrey, Kara Flynn, Rochelle Cassells, Marnie Gelbart, Charlie Wray*

*Strand: Broadening Participation*

*Room: Ballroom C*

**Funding Opportunities from Federal Agencies**

*National Science Foundation: Robert Russell*

*Department of Education: Christina Chhin*

*NIGMS Interactive Digital Media STEM SBIR/STTR: Tony Beck*

*Strand: Program Administration*

*Room: Latrobe*

**Conceptualizing and Evaluating Partnerships: Invitation to Discuss and Revise Tools (frameworks and instruments)**

*Michelle Phillip, Lindley McDavid, Loran Carleton Parker*

*Strand: Research and Evaluation*

*Room: Arlington/Cabin John*

**Using Research Inside and Outside the Classroom to Increase Students' Interest in Science**

*Tony Ward, Derrick Scott, Robin Fuchs-Young, James Breeden*

*Strand: Research Experiences for Students and Teachers*

Room: Roosevelt/Wilson

**Themed Session: Teacher Professional Development**

(20 minutes/presentation, including Q&A)

Room: Ballroom E

Moderator: Carmela Amato-Wierda, Associate Professor of Materials Science, University of New Hampshire

- SHAPE MATTERS: Building Teachers' Capacity to Incorporate Authentic Modeling Practices that Mirror the Work of Molecular Biology Researchers in Secondary-level Science Classrooms – *Kathleen Hill, Tiffany Lewis, Amber Cesare*
- The NH CREATES Teachers Institute: A Model of Professional Development for Middle and High School STEM Teachers – *Carmela Amato-Wierda, Amy Booth, Alison Allen*
- Interventions to Support Teacher and Student Engagement in the Citizen Science Project “All About Arsenic” during the Covid-19 Pandemic – *Jane Disney, Kate Buckman, Sarah Hall, Isadora Muñoz, Anna Farrell, Abby Roche, Hannah Lust, Karen Bieluch, Bill Zoellick, Bruch Stanton*
- Strategies for Expanding Your Program's Teacher Network – *Atom Lesiak, Joan Griswold*

3:15-3:30 Break

3:30-4:00 **Flash Talks for Poster Session 2**

4:00-5:00 **Poster Session 2**  
Remove posters at the end of the session

**Friday, June 3**

7:15-8:30 Breakfast

**Covid-19 antigen testing if you tested on Tuesday**

3. Carry out a Covid antigen test in your hotel room
4. Submit your completed test cassette at the registration desk, before entering the main conference space

8:30-9:45 **Concurrent Breakout Sessions**

**Program Sustainment, Integrity and Continuity: Finding the Gaps**

*Debra Yourick, Holly Brown, Laura Tenenbaum*  
*Strand: Broadening Participation, Program Administration*  
*Room: Ballroom E*

**Gamification to Engage Youth with Ecological Networks and Health Implications**

*Nik Stevenson*  
*Strand: Informal Science Education*  
*Room: Arlington/Cabin John*

**Teaching the Genome Generation: Incorporating Data Analysis and Quantitative Skills into Biology Classrooms through Bioinformatics**

*Sarah Wojiski, Erica Gerace, Christina Vallianatos, Charlie Wray*  
*Strand: Curriculum Development – Curriculum Training Workshop*  
*Room: Roosevelt/Wilson*

**Inclusive Measurement of Trainee Demographics within Biomedical Research Training Programs**

*Sunita Chaudhary, Karen Burns White, Linda Kennedy, Megan Mekinda, Lisa Marriott, Nathan Vanderford*  
*Strand: Research and Evaluation*  
*Room: Ballroom D*

*\*This will be a hybrid session. You can attend in person or join with a laptop or device that connects online and allows you to participate.*

**Zoom meeting:**

: <https://uchicagomedicine.zoom.us/j/97569084557?pwd=eFNoN0hDWVNJeTd5RHRGcjINV3M3Zz09>

Meeting ID: 975 6908 4557 | Passcode: 64269411

**Themed Session: Programs for Elementary Students and Teachers**

*(20 minutes/presentation, including Q&A)*  
*Room: Latrobe*

*Moderator: Virginia Stage, PhD, RDN, Associate Professor of Nutrition Science, College of Allied Health Sciences, East Carolina University*

- Implementing Professional Learning Communities (PLCs) in the Early Childhood Settings: Resources Developed, Lessons Learned, and the Path – *Archana Hegde, Virginia Stage*  
*Strand: Teacher Professional Development*
- Authentic Community Engagement in Sciences Strikes Again! – *Matt Queen*  
*Strands: Curriculum Development, Informal Science Education, Interactive Multimedia*
- Biomechanics to Develop Interdisciplinary Experiences in Early Elementary Science: Exploring Informal Education and Community Based Learning – *Amelia Lanier Knarr*  
*Strand: Informal Science Education*

- Climate Club: Environmental Health Research Education for Young Citizen Scientists  
- *Lauren Bates, Susan Gertz*  
*Strand: Informal Science Education*

9:45-10:00 Break

10:00-11:15 **Concurrent Breakout Sessions**

**Explore the National Science Teaching Association’s (NSTA) High Quality Lesson Plans for Implementing the Next Generation Science Standards (NGSS)**

*Erika Shugart, Wendy Binder*  
*Strand: Curriculum Development*  
*Room: Roosevelt/Wilson*

**DNA Barcoding in a Pandemic: Hands-on Techniques for Remote Learning**

*Sharon Pepenella*  
*Strand: Informal Science Education – Training Session*  
*Room: Ballroom C*

**STEM Storytelling Bootcamp: Meet Your Project Coach**

*Leah Clapman, Mohammad Pasha*  
*Strand: Interactive Multimedia*  
*Room: Arlington/Cabin John*

**Authentic Research Experiences for Students and Teachers in Faculty Labs and Citizen Science**

*Robin Fuchs-Young, James Breeden, Derrick Scott, Tony Ward*  
*Strand: Research Experiences for Students & Teachers*  
*Room: Ballroom E*

**Curriculum “Lemonade Stands”** – browse curriculum materials developed by SciEd projects that are ready for dissemination

*Strand: Curriculum Development*  
*Room: Constitution Ballroom A/B*

1. The Mystery of the Monkeyflower: Explore a Biology High School Curriculum through a Comic Book and Real-World Research – *Renee Bayer*
2. More PEAS Please! Engaging Preschool Head Start Children in the Process of Science – *Jocelyn Dixon*
3. The Adaptive Immunity Kit and Making the Cut,...with CRISPR – *Tim Herman, Heather Ryan*
4. Blood Sugar Balance – *Atom Lesiak, Joan Griswold*
5. Discover SCIENCE with Dr. Bear – *Naomi Luban, Rachel Smilow, Julia Miller, Annika Hvide*



6. The Scientist Spotlights Initiative: Teaching Science Content through Curricular Supplements that Feature Counter-stereotypical Scientists and Engage Students with Written Reflections – *Dax Ovid, Lucy Luong, Kimberly Tanner, Jeff Schinske*
7. Biotinkering Activity Resources for Families, Educators, and Institutions – *Anja Scholze, James Wong, Caitlin Nealon, Abbey Thompson*
8. Frontiers in Cancer Research – *Regina Wu, Jeanne Chowning, Kristen Bergsman*

11:15-11:30 Break

11:30-12:00 **Town Hall Discussion**

*Tony Beck, PhD, Program Director, Science Education Partnership Award (SEPA), Division for Research Capacity Building, National Institute of General Medical Sciences (NIGMS), NIH*

Lunch on your own

# Round Table Abstracts

Wednesday, June 1, 10:45 – 12:00

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## 1 - Co-designing Youth Outreach with Youth Partners

The New York Hall of Science has a demonstrated history of working with youth from diverse backgrounds toward the development of scientific skills and interest and engagement in STEM career pathways through our signature Science Career Ladder program. NYSCI's approach to youth development is an integral facet of our ongoing SEPA project focused on exploring public health careers with young people. NYSCI SEPA team members will describe the multiple pathways this project provides to NYSCI Explainers and other local youth to engage in exploring STEM career pathways by making direct contributions to the design and development of the project's deliverables. We will discuss the active participation of our youth explainer Research Fellows in the project, their critical contributions to the project's direction, and the development of their research skills. At this roundtable we will describe the concentric circles of youth engagement involved in our project, the specific roles that explainer fellows are playing in our research and development processes, and how this will inform the next stages of work.

Presenters:

Priya Mohabir, BA, Senior Vice President, Youth Development and Museum Culture, New York Hall of Science

Laycca Umer, MS, Manager, Research, Exhibits, and Programs, New York Hall of Science

Strand: Broadening Participation

## 2 - Data Sonification

Authentic-learning experiences are a proven, effective approach for students to learn these science concepts, while gaining exposure to real world science and gaining a stronger sense of belonging in STEM and higher education. To address this overall need, we have assembled an interdisciplinary team to build a virtual authentic-learning tool utilizing data sonification (i.e. translating data to sound) to analyze protein amino acid sequences and to identify changes in protein structure and function, ultimately increasing understanding of the molecular basis of disease. Natural (healthy) and mutated (diseased) protein sequences, including A $\beta$ 42 in Alzheimer's Disease, Parkinson's disease and the binding targets of the central calcium signaling protein calmodulin, were retrieved from UniProt's protein databases, and amino acids were categorized based on a hydrophobicity index. Based on this physical characterization, each amino acid is mapped to a musical scale or chord using the data sonification software. At positions where mutations arise, a wave shaping distortion occurs to sonically demonstrate how a mutation disrupts the way the protein folds or binds with its targets. We expect our results will lead to a widespread virtual learning module for students to be shared with the STEM Education community.

Presenter:

Luke Bradley PhD, Professor and Acting Chair, Neuroscience, University of Kentucky

Strand: Broadening Participation

### **3 - Termighty Guts, Version 2.0**

During our previous SEPA program, our team developed and published What's Inside a Termite's Gut? (Morales et al. 2017, The Science Teacher), a hands-on lesson about homeostasis. During our current SEPA program, this fun lesson incorporates additional demonstrations/discrepant events, and student-led scientific inquiry about symbiosis. The SEPA community is invited to join the fun, and engage in this lesson. We'll even show you how we find termites in the field.

Presenter:

Holly Brown, PhD, NASEM Fellow, Walter Reed Army Institute of Research

Strand: Broadening Participation

### **4 - Using Storylines to Align SEPA Projects with the NRC Framework and the NGSS**

A storyline is a pedagogical strategy to engage students in a wide array of investigative practices associated with the creation, evaluation, and revision of explanatory models. Storyline units begin by exposing students to an anchoring phenomenon that introduces a question or problem. Each step in a storyline learning pathway is then driven by students' questions about the phenomenon. Our efforts to adapt a multidisciplinary ISE experience into an NGSS-aligned learning experience have culminated in the creation of a storyline-based instructional unit for high school course integration. This unit is anchored to a rare genetic movement disorder (congenital mirror movement disorder; OMIM:157600) in which voluntary movements performed on one side of the body axis are mirrored, to varying extents, by involuntary movements on the contralateral side. The goal of this roundtable discussion is two-fold: 1) to stimulate dialog on the use of storylines to align SEPA projects and biomedical phenomena with the NRC Framework and the NGSS, and 2) to assess interest in a workshop-style breakout session during the 2023 SciEd conference that highlights how to design storyline-based units that engage teachers and students in an exploration of interconnected ideas, concepts, and data relevant to SEPA projects and NIH-funded biomedical research.

Presenter:

Ralph Imondi, PhD, Executive Director, Integrative Biosciences Program at Coastal Marine Biolabs

Strand: Curriculum Development

### **5 - VENOM-venture/A-VENENO-tura: Learning in an immersive, high-motivation serious game for families in informal environments**

VENOM-venture/A-VENENO-tura is a pop-up, educational, bilingual escape room about evolution and medicine. Teams of 2-5 players (usually family groups) build an understanding of evolutionary relationships and tree diagrams as they solve puzzles and identify an antivenom to save the world. The game provides the motivation and support for families to engage deeply with these evolutionary concepts and constructs. Learners iteratively test and revise their understandings of these concepts, as they assess traits, trace lineages, and reconstruct trait evolution through time in a series of puzzles. Come try three activities from the game, learn about the game's narrative arc, and discuss how to foster learning through brief, but highly immersive and engaging educational experiences.

Presenters:

Lisa White, PhD, Director of Education and Outreach, University of California Museum of Paleontology

Teresa MacDonald, Associate Director of Informal Science Education, University of Kansas Natural History Museum

Strand: Informal Science Education

## **6 - Working Without a Protocol: Supporting Participants through Experimental Uncertainty**

Making experimental choices without knowing exactly the correct decision is a critical component of authentic science practices, but most student biology experiences are presented in a straightforward and linear format. Over the last several years, our team has developed biotinkering activities which are designed to offer visitors the opportunity to engage with open-ended choice and exploration with biology. We believe that exposure to the real uncertainty of scientific experimentation in a low-stakes creative environment better prepares students for some of the realities of a career in science. However, this intentional design often creates a moment for visitors where they express uncertainty and discomfort at finding themselves in the driver's seat of an experiment.

Join us for a discussion of ways to design experiences that center uncertainty in the experimental process. We look forward to hearing about the approaches other teams have used to help support participants through these moments.

Presenter:

Caitlin Nealon, PhD, Life Sciences Experience Developer, The Tech Interactive

Strand: Informal Science Education

## **7 - Creating a Learning Assessment System to Evaluate Curriculum Efficacy**

The sole purpose of curriculum design or curriculum reform is to improve student learning. However, in practice many curriculum designs/reforms take place with little built-in assessment of learning as the indicator of curriculum efficacy. In the SEPA Science of Essential Balance

project (NIGMS, 2018-2023), a multi-dimensional learning assessment system was designed with the development of the curriculum. The system includes three major components: a battery of standardized knowledge tests, a collection of daily problem-solving assignments, and a staged student knowledge interview. The three systems support each other to enforce as well as supplement the functions of each individual component. Each component is validated to ensure the quality of assessment outcome (validity/reliability/trustworthiness). The preliminary data have demonstrated the system's advantages in determining curriculum efficacy. The piloted analysis procedure also indicates a strong need to develop an automated grading system to reduce the labor of grading by teachers.

Presenter:

Ang Chen, PhD, Professor, University of North Carolina at Greensboro

Strand: Research and Evaluation

### **8 - Developing and Disseminating a SEPA Project's Results and Material**

The identity of high school students is malleable and is often in a state of rapid change. Given this, a prior SEPA project, the San Francisco Health Investigators (SFHI), sought (in part) to influence student identity through a yearly authentic research experience in STEM. To measure participants' "researcher identity," we developed and validated two surveys. Both aspects of the project (i.e., enhancing students' researcher identity and developing validated measures) were leveraged together to support each other, and our intentions to disseminate our findings.

For the presentation, we plan to begin by leading a three to five minutes discussion introducing the papers and the strategies we developed for ensuring publication. The next 10-15 minutes we will (a) discuss in more detail the keys that we used to successfully write and publish papers and (b) solicit other strategies from SEPA participants. For example, one key we discovered early was to mine the resources and interests of project members to ensure we could publish broadly. Finally, during the last three to five minutes, we will summarize the discussion and then connect our past approach to our current SEPA project where we are focusing on "belonging in science."

Presenters:

Linda Morell, PhD, Senior Research Scientist, University of California, Berkeley

Katherine Nielson, MA, Director, University of California, San Francisco

Michelle Phillips, PhD, Evaluator, Phillips & Associates

Strand: Research and Evaluation

### **9 - Rural and Indigenous Student Engagement in Biomedical Science and Research: Culture, Place, and Perspective**

Rural Alaska Students in One-Health Research (RASOR) is an innovative partnership between a regional university and tribal organizations offering students community-based research

opportunities. Topics emphasize the interconnectedness of human, animal, and environmental health, a prominent feature of indigenous worldviews, known academically as the One Health concept. RASOR's focus is on culturally-relevant and respectful, place-based strategies to engage students and communities in science research and education opportunities. The goal of this roundtable discussion is to promote indigenous perspectives in research, science education, and academic and career pathways. We are interested in strategies for impactful research experiences in remote communities, cross-program collaborations, co-existing with evaluators, and students as program ambassadors to communities and future students.

Presenters:

Jan Straley, MS, Professor, University of Alaska Southeast

Ellen Chenoweth, PhD, Program Director, UAS Rural Alaska Students in One-Health Research (RASOR)

Paul Cotter, PhD, Principal, Evalulogic

Strand: Research Experiences for Students and Teachers

### **10 - Conceptual Model Building: Developing Understanding through Revision & Collaboration**

Frontiers in Cancer Research, a program developed by the Science Education Partnership at Fred Hutchinson Cancer Research Center, increases understanding of molecular and cellular biology and how scientific practices such as argumentation and sensemaking are used in research. Working with teachers and scientists, Frontiers in Cancer Research has developed two story-lined units that incorporate conceptual model building as a strategy for helping students track their understanding of a phenomenon over time.

In this session, we will explore the strategies and reasoning behind conceptual model building in the classroom. Through model building, students have the opportunity to engage in several scientific practices including constructing explanations, asking questions, and practicing argumentation.

Participants will engage in initial model building through our cancer-based phenomenon as presented in the first lesson of our Intro to Cancer Unit. Presenters will also share examples of student work. During this session, participants will have an opportunity to share and discuss how modeling is used in their own SEPA projects.

Presenters:

Regina Wu, BA, Program Manager, Fred Hutchison Cancer Center

Jeanne Chowning, PhD, Senior Director, Science Education, Fred Hutchinson Cancer Center

Kristen Bergsman, PhD, Curriculum Design Project Lead, Fred Hutchinson Cancer Center

Strand: Science Teaching and Learning

### **11 - Designing Brain-based Informed Positive Impact Learning Environments**

This roundtable topic aims to facilitate discussion that aligns social, behavioral, and educational research (SBER) and theory to the physiology of the brain. Questions for discussion include: What is brain-based learning? How are formal and informal science educators using brain-based learning to guide teaching practice and learning environment design? What are the strengths and limitations of informing teaching practice and learning environment design from the lens of brain-based learning?

Presenter:

Melani W. Duffrin, PhD, RDN, Professor of Health Sciences, Northern Illinois University

Strand: Science Teaching and Learning

### **12 - What can you do with 22 minutes? Exploring ESTA's Litterati Efforts for 22 in 22 on 22**

Working with 30 middle and high school teachers, Environmental Science through the Arts (ESTA) collaborated with students, families, businesses, and communities across the region to actively celebrate Earth Day. The challenge is to spend at least 22 minutes collecting and documenting the litter at our schools, in our neighborhoods, and in our communities. The project is designed to develop a curriculum that uses art and science to address human health impacts of plastic pollution. We report the regional distribution and other variables associated with the event and participant engagement.

Presenters:

Corin Slown, PhD, Associate Professor, California State University Monterey Bay

Viviana Vigil, Undergraduate Researcher, California State University Monterey Bay Eros

Gonzalez-Lopez, Undergraduate Researcher, California State University Monterey Bay

Kenneth Tran, Undergraduate Researcher, California State University Monterey Bay Kariya

Hunter, Undergraduate Researcher, California State University Monterey Bay Dan

Fernandez, PhD, Professor, California State University Monterey Bay

Enid Rice, PhD, Professor, California State University Monterey Bay

Amir Attia, Assistant Professor, California State University Monterey Bay

Brenda Eskenazi, PhD, Adjunct Researcher, California State University Monterey Bay

Asa Brandman, PhD, Chair and Professor of Public Health, University of California Merced

Strand: Science Teaching and Learning

### **13 - Resources to Engage and Inform Students About the Health Effects of Vaping**

Teachers in the Linking Science and Literacy for All Learners SEPA program (Poster #7) implementing the Multimodal STEM Text Set “Vaping – Not for the Young at Heart” (<https://scienceandliteracy.missouri.edu/resources-materials/>) are reporting increased student understanding of: i) the harmful effects of nicotine and other substances in vaping fluids; ii)

human body systems affected by vaping; iii) science practices used to obtain evidence about health

(<https://umsystem.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=ed134d99-4a54-44ce-92ab-ae9700e4bf3a>). Youth vaping has risen to epidemic levels – in 2019 over 10% of middle school students and over 25% of high school students reported current use of e-cigarettes; and with interruptions in schooling due to COVID-19 this has likely risen. Young e-cigarette users have significantly greater odds of subsequent initiation of cigarette smoking that is strongly associated with elevated risk of cancers, cardiopulmonary diseases and other chronic health conditions. Nicotine affects brain development and promotes substance addiction, mood disorders, lowering of impulse control, and deficits in attention and learning. Evidence-based interventions to decrease e-cigarette use by school age youths are desperately needed, and this roundtable will discuss approaches to *critically evaluate* their impact.

Our focus question will be: How do we overcome the practical challenges in developing “evaluation designs similar to an RCT or Well-Matched Case Comparison Study” (recommended by SEPA-R25 PAR)?

Presenter:

William Folk, PhD, Professor, University of Missouri

Strand: Science Teaching and Learning

#### **14 - Creating a Multi-institutional Cancer-focused Course Collaborative for Middle and High School Teachers**

Science education programs have an opportunity to provide graduate-level coursework for middle and high school teachers. However, given the small number of teachers who participate in a single program, it is challenging for a single program to meet individual teacher needs. A proposed solution is for multiple institutions to collaborate to offer a menu of online courses that teachers could complete. This roundtable will discuss this idea and how to move forward with interested institutions.

Presenters:

Nathan Vanderford, PhD, Associate Professor, University of Kentucky

Louisa A. Stark, PhD, Professor of Human Genetics and Director, Genetic Science Learning Center, University of Utah

Strand: Teacher Professional Development



## Breakout Session Summary by Strand

### Broadening Participation

<b>Session Title</b>	<b>Day/Time</b>	<b>Room</b>
Let's party like it's 2019! Broadening Participation through Data Parties	Wednesday, 2:00-3:15	Roosevelt/Wilson
Pandemic Lessons Learned: Stories from the SEPA Community	Thursday, 10:15-11:30	Latrobe
Using Seminars to Discuss Health Inequities in the Science Classroom	Thursday, 10:15-11:30	Ballroom C
Best Practices for Engaging Members of the Deaf Community in Science Education Programs: An Informal Discussion with Teresa Blankmeyer Burke, PhD	Thursday, 2:00-3:15	Ballroom D
Engaging Different Audiences in the Importance of Genetics and Genomics	Thursday, 2:00-3:15	Ballroom C
Program Sustainment, Integrity and Continuity: Finding the Gaps	Friday, 8:30-9:45	Ballroom E

### Curriculum Development

<b>Session Title</b>	<b>Day/Time</b>	<b>Room</b>
Engaging Students and Teachers with the Big Data from the <i>All of Us</i> Research Program	Wednesday, 2:00-3:15	Ballroom D
Using Seminars to Discuss Health Inequities in the Science Classroom	Thursday, 10:15-11:30	Ballroom C
Teaching the Genome Generation: Incorporating Data Analysis and Quantitative Skills into Biology Classrooms through Bioinformatics	Friday, 8:30-9:45	Roosevelt/Wilson
Themed Session: Programs for Elementary Students and Teachers - Authentic Community Engagement in Sciences Strikes Again!	Friday, 8:30-9:45	Latrobe
Explore the National Science Teaching Association's (NSTA) High Quality Lesson Plans for Implementing the Next Generation Science Standards (NGSS)	Friday, 10:00-11:15	Roosevelt/Wilson
Curriculum "Lemonade Stands"	Friday, 10:00-11:15	Constitution Ballroom A/B

### Informal Science Education

<b>Session Title</b>	<b>Day/Time</b>	<b>Room</b>
Themed Session: Informal Science Education	Wednesday, 2:00-3:15	Latrobe
How to Develop Science and Health Outreach Stories for All Ages	Thursday, 10:15-11:30	Ballroom E

Stories from the Field: A Panel Discussion on SEPA Project Replication	Thursday, 10:15-11:30	Roosevelt/Wilson
Gamification to Engage Youth with Ecological Networks and Health Implications	Friday, 8:30-9:45	Arlington/Cabin John
Themed Session: Programs for Elementary Students and Teachers - Authentic Community Engagement in Sciences Strikes Again!	Friday, 8:30-9:45	Latrobe
Themed Session: Programs for Elementary Students and Teachers - Biomechanics to Develop Interdisciplinary Experiences in Early Elementary Science	Friday, 8:30-9:45	Latrobe
Themed Session: Programs for Elementary Students and Teachers – Climate Club: Environmental Health Research Education for Young Citizen Scientists	Friday, 8:30-9:45	Latrobe
DNA Barcoding in a Pandemic: Hands-on Techniques for Remote Learning	Friday, 10:00-11:15	Ballroom C

## Interactive Multimedia for STEM Learning

<b>Session Title</b>	<b>Day/Time</b>	<b>Room</b>
Game Design for Systems Thinking	Wednesday, 2:00-3:15	Ballroom C
Themed Session: Programs for Elementary Students and Teachers - Authentic Community Engagement in Sciences Strikes Again!	Friday, 8:30-9:45	Latrobe
STEM Storytelling Bootcamp: Meet Your Project Coach	Friday, 10:00-11:15	Arlington/Cabin John

## Project Administration

<b>Session Title</b>	<b>Day/Time</b>	<b>Room</b>
Stories from the Field: A Panel Discussion on SEPA Project Replication	Thursday, 10:15-11:30	Roosevelt/Wilson
Professional Writing Groups: How to Start and Maintain a Collaborative (and Fun) SciEd Writing Group to Support Project Dissemination	Thursday, 10:15-11:30	Arlington/Cabin John
Funding Opportunities from Federal Agencies	Thursday, 2:00-3:15	Latrobe
Program Sustainment, Integrity and Continuity: Finding the Gaps	Friday, 8:30-9:45	Ballroom E

## Research and Evaluation

<b>Session Title</b>	<b>Day/Time</b>	<b>Room</b>
Using the Better Evaluation Rainbow Framework to Improve the Quality of SciEd Evaluations	Wednesday, 2:00-3:15	Arlington/Cabin John
Professional Writing Groups: How to Start and Maintain a Collaborative (and Fun) SciEd Writing Group to Support Project Dissemination	Thursday, 10:15-11:30	Arlington/Cabin John

Conceptualizing and Evaluating Partnerships: Invitation to Discuss and Revise Tools (frameworks and instruments)	Thursday, 2:00-3:15	Arlington/Cabin John
Inclusive Measurement of Trainee Demographics within Biomedical Research Training Programs	Friday, 8:30-9:45	Ballroom D and virtual

## Research Experiences for Students and Teachers

<b>Session Title</b>	<b>Day/Time</b>	<b>Room</b>
Using Research Inside and Outside the Classroom to Increase Students' Interest in Science	Thursday, 2:00-3:15	Roosevelt/Wilson
Authentic Research Experiences for Students and Teachers in Faculty Labs and Citizen Science	Friday, 10:00-11:15	Ballroom E

## Science Teaching and Learning

<b>Session Title</b>	<b>Day/Time</b>	<b>Room</b>
Promoting Computational Thinking through Neuroscience & Engineering Design Activities	Wednesday, 2:00-3:15	Ballroom E
Systems Thinking Applications Across Multiple Distinct Fields	Thursday, 10:15-11:30	Ballroom D

## Teacher Professional Development

<b>Session Title</b>	<b>Day/Time</b>	<b>Room</b>
Themed Session: Teacher Professional Development	Thursday, 2:00-3:15	Ballroom E
Themed Session: Programs for Elementary Students and Teachers - Implementing Professional Learning Communities (PLCs) in the Early Childhood Settings	Friday, 8:30-9:45	Latrobe

# Breakout Session Abstracts

Wednesday, June 1. 2:00 – 3:15 PM

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## **Let's party like it's 2019! Broadening participation through Data Parties**

Why a data party you might be asking? Data parties are a form of participatory data analysis that can include all types of project partners including scientists, educators, and even students. They're not just limited to evaluation data, but can be done with scientific research data that is compiled and shared across classrooms, programs, or other project sites. Our goal is to share the ingredients for making a successful data party that can provide your project and stakeholders maximum impact with the data with minimal preparation time on your part.

There is no need to RSVP to our session or to BYOD (Bring Your Own Data). We'll have a set of anonymous responses that we can discuss together. After a brief introduction, we'll spend our time trying a data party activity or two. You'll get plenty of chances to ask questions along the way and share your experiences with similar activities. At the end, you'll have the opportunity to reflect on what you've learned and begin to plan your own party if you feel so inclined.

As a result of participating in this session, conference attendees will:

- think creatively about engaging scientists, teachers, and students with data
- give at least one purpose for a data party
- identify some simple strategies for sharing qualitative and quantitative data
- learn some data analysis games
- generate ideas for their own data parties

Level: Beginner

Facilitators:

Kirstin Bass, PhD, Director of Research Development, Rockman et al Cooperative  
Alison Allen, M.A., Senior Research Associate, Rockman et al Cooperative

Strand: Broadening Participation – Training Session

Room: Rossevelt/Wilson

## **Engaging Students and Teachers with the Big Data from the *All of Us* Research Program**

The NIH *All of Us* Research Program is inviting 1 million people across the US to help build one of the most diverse health databases in history. Researchers - including citizen scientists - will use the data to learn how our biology, lifestyle, and environment affect health.

In this workshop you'll learn about the data available through the *All of Us* Research Program, with a focus on the publicly-available data that is most accessible to teachers and secondary students. You'll then have an opportunity to explore a research question that uses the data. Finally, we'll brainstorm ideas for educational materials and teacher guides that could support use of this data at the secondary level.

As a result of participating in this session, conference attendees will:

- become aware of the data available through the NIH All of Us Research Program
- experience a short exploration of these data
- consider the supports needed for secondary students and teachers to utilize these data

Level: All

Presenters and Facilitators

Rubin Baskir, PhD, Engagement Specialist, NIH *All of Us* Research Program

Yong Crosby, Special Assistant, NIH *All of Us* Research Program

*All of Us* Research Program staff

Louisa Stark, PhD, Professor of Human Genetics and Director, Genetic Science Learning Center,  
University of Utah

Strand: Curriculum Development

Room: Ballroom D

### **Themed Session: Informal Science Education**

Community Listening Sessions: Inviting Community Participation in Exploring Racially Inequitable Health Outcomes and Public Health Careers

During Year 1 of our SEPA project, The New York Hall of Science, in partnership with Elmcot Youth and Adult Activity Inc., ran a series of community listening sessions to help us better understand how local residents perceive the impacts of the COVID-19 pandemic on our local community of Corona and Elmhurst, Queens, New York City. A series of focus groups with community members and advisory conversations with local medical experts provided critical insight toward how best to support dialogue between local residents and scientific and medical experts around shared issues of importance during two community forums. The community forums brought together community members and medical and public health experts to further reflect on how their lived experiences relate to empirical evidence, and engage in future thinking about professional roles, careers, structures and systems in public health that can help address inequitable health outcomes.

Presenters will discuss key takeaways from these community listening sessions around what issues were of most importance to local residents, and what we have learned about best practices for crafting a productive dialogue among community members and scientific, medical, and public health experts in ways that the community truly feels they have a voice.

Presenters:

Laycca Umer, MS, Manager, Research, Exhibits & Programs, New York Hall of Science

Priya Mohabir, BA, Senior Vice President, Youth Development and Museum Culture, New York Hall of Science

Bicultural & Bilingual Co-development for Informal Science Education Projects

Funded by the Interactive Family Learning grant, AlegreMENTE | Happy Brain is a bilingual (Spanish/English), nationally traveling museum exhibition that invites families with young children (ages 0-5) to learn how simple everyday interactions support healthy brain development for lifelong benefits. The project's focus on Latino families motivated OMSI to co-develop content and evaluation bilingually and biculturally with a team including content developers and evaluators that are bilingual and bicultural (Spanish-English and Latino-American immigrant), as well as those whose native language is English. The working model of co-development was a process that intentionally included and represented the voices of stakeholders throughout the project. This project also serves as a case study of putting OMSI's Equity Action Framework into practice. The framework outlines how staff and community partners can work to identify and interrupt patterns in the organizational systems that perpetuate inequalities.

Presenter:

Cecilia Nguyen, BA, Senior Exhibit Developer, Oregon Museum of Science and Industry

Puzzling out Ancient DNA Stories: Lessons From Developing an Unplugged Bioinformatics Activity

Over the past few years we have created a puzzle-solving activity for museum visitors to use genetic sequences to discover more about real-life ancient individuals. Through many rounds of prototyping and iterations, we streamlined the activity to the point where very young learners with no prior familiarity with DNA can successfully align sequences, identify variants, and predict phenotypes. Tiered difficulty levels and layered content make it possible to simultaneously engage different interest levels, ages, and learning styles.

This deeper-dive into the activity development process will cover some of our less successful early designs as well as puzzle mechanisms that engage learners. We will share our observations of how kids approach sequence alignments and how we have successfully introduced learners to assorted genetic principles and complexities.

Presenter:

Abbey Thompson, PhD, Director of Educational Outreach, Stanford Genetics

Assessing Cancer Literacy and Risk Behaviors among Appalachian Kentuckians through an Oral History Approach

Kentucky ranks first in the nation in cancer incidence and mortality with the greatest of these disparities being found in the Appalachian region of the state. Using an oral history approach, we aimed to better understand cancer in the region through individual perspectives. This study aimed to assess cancer literacy and health behaviors and examine how these factors may be contributing to the cancer epidemic. Using convenience sampling, we recruited individuals from within the community that identified as currently residing in or having strong ties to the Appalachian region. Participants exhibited varying experiences with cancer, including a personal diagnosis, personal experience outside of their own such as that of a family member and/or working in a cancer-related field. Interview responses were analyzed using qualitative content analysis and categorized into themes, subthemes, and subtopics, respectively. Themes that emerged include cancer literacy; experiences with cancer; impressions of the healthcare system; cancer risk behaviors and influences thereof; factors that influence healthcare-seeking behaviors; potential solutions; and Appalachian characteristics. Our findings demonstrate the need for educational interventions, healthcare outreach, increased access, the development of

recreational infrastructure, social support systems, and the need to address the cancer problem from within the region itself. These changes can take on various forms, such as integrating cancer education into the curriculum of schools, creating policies focused on expanded access to healthcare facilities and/or recreational activities for community members, and using Appalachian voices as part of the solution. Overall, if acted upon, these changes have the potential to reduce the cancer burden in this area.

Presenter:

Courtney Martin, Undergraduate, University of Kentucky

Strand: Informal Science Education

Room: Latrobe

### **Game Design for Systems Thinking**

Games offer an interactive context to think through and experiment with complex problems. At the Center for Interdisciplinary Innovation and Inquiry in Sexual and Reproductive Health (Ci3) at the University of Chicago, we use game-based learning and game design to engage young people in STEM and health topics, build their social-emotional and analytical skills, provide an “in” to serious discussion, and develop a systems-thinking perspective through our SEPA-funded project, Hexacago Health Academy (HHA) 2.0.

In this session, we will explore HHA’s methodology in a game design workshop of our own. Participants will have the option to redesign an existing game to model their desired system or begin to build their own game prototype from scratch. Through engaging in the design process, session participants will develop a deep understanding of how games can shift attitudes, knowledge, and behaviors around STEM and health topics. Finally, we’ll review examples of HHA board games initially prototyped by young people, and discuss next steps for implementation and evaluation.

As a result of participating in this session, conference attendees will:

- understand the specific affordances of game-based learning
- understand the process of designing an educational board game
- envision ways to implement principles of game design and play into their own work

Level: Beginner

Presenter:

Ailea Stites, BA, Youth Engagement Lead, Ci3 at the University of Chicago

Strand: Interactive Multimedia

Room: Ballroom C

### **Using the Better Evaluation Rainbow Framework to Improve the Quality of SEPA Evaluations**

This session is intended to develop evaluation knowledge and skills within the SEPA community, regardless of the participants’ role within a project. We will introduce participants to the Better Evaluation Rainbow Framework, an approach to organizing and understanding the methods and

processes used in evaluation. Participants will then break into discussion groups based on interest in four of the framework areas—Manage, Define, Frame and Report—and work collaboratively to apply that area to their own SEPA evaluation. Participants will identify areas of alignment and opportunities for improvement in their SEPA evaluation approaches, and ultimately discuss ways in which SEPA evaluation overall can be improved.

As a result of participating in this session, conference attendees will:

- be introduced to the Better Evaluation Rainbow framework and its evaluation resources
- apply at least one area of the framework to their own SEPA evaluation
- identify areas of alignment and opportunities for improvement in their own evaluation
- engage in the large group discussion of insights and suggestions to improve evaluation across projects

Level: Beginner

Presenters:

Alana Newell, PhD, Assistant Professor, Baylor College of Medicine

Loran Carleton Parker, PhD, Associate Director, Principal Scholar, Evaluation and Learning Research Center, Purdue University

Strand: Research and Evaluation – Training Session

Room: Arlington/Cabin John

### **Promoting Computational Thinking through Neuroscience & Engineering Design Activities**

Computational thinking (CT) practices like abstraction, pattern recognition, and modeling are now used in virtually all STEM disciplines. This has been recognized by the Next Generation Science Standards (NGSS), which views CT as a core science and engineering practice. However, most existing K-12 CT efforts focus on computer science courses, which are taken by small numbers of students, especially those from groups underrepresented in STEM. Therefore, there is a critical need to integrate CT more broadly into science and engineering courses. In this interactive session, participants will explore a new approach to facilitating CT through neuroscience and engineering design activities. They will experience this approach by measuring their own muscle activity and using a human-machine interface, where muscle activity is used to control a robotic claw. Based on this activity, participants will discuss what is CT and what specific practices it entails. The session will review some existing theoretical frameworks and approaches and conclude with a discussion on the relevance of these approaches to SEPA-funded programs.

As a result of participating in this session, conference attendees will be able to:

- describe computational thinking practices
- describe how these practices can be incorporated into K-12 science courses

Level: Beginner

Presenter:

Ido Davidesco, PhD, Assistant Professor of Learning Sciences, University of Connecticut

Strand: Science Teaching and Learning



Room: Ballroom E

Thursday, June 2. 10:15 – 11:30 AM

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### **Pandemic Lessons Learned: Stories from the SciEd Community**

Follow-on session for interested NIH SciEd participants to bring their own stories of their findings carrying out SciEd projects during the pandemic. Outcomes will be captured and communicated.

As a result of participating in this session, conference attendees will:

- gain a broader understanding and perhaps usable information regarding SciEd projects' responses and outcomes during the pandemic

Level: Beginner

Presenters and Facilitators:

Anjan Nan, PhD, Associate Professor of Pharmaceutical Sciences, University of Maryland Eastern Shore

Molly McAndrew, MS, START Graduate Teaching Assistant, University of Kentucky

Luke Bradley, PhD, Professor and Acting Chair of Neuroscience, University of Kentucky School of Medicine

Debra Yourick, PhD, Director, Science Education and Fellowship Programs, Walter Reed Army Institute of Research

Brittany Swift, PhD, Walter Reed Army Institute of Research

Nico Ekanem, PhD, National Academy of Sciences, Engineering and Medicine/National Research Council Fellow, Walter Reed Army Institute of Research

Strand: Broadening Participation

Room: Latrobe

### **Using Seminars to Discuss Health Inequities in the Science Classroom**

Frontiers in Cancer Research, a program developed by the Science Education Partnership at Fred Hutchinson Cancer Research Center, increases understanding of molecular and cellular biology and how scientific practices such as argumentation and sensemaking are used in research. Working with teachers and scientists, we have developed NGSS-aligned curricula and kits which focus on research at Fred Hutch and include topics such as immunotherapy and stem cell transplantation.

In this session, we will engage participants in a seminar discussion from our Intro to Cancer: Leukemia & Hina's Story unit. This unit investigates the case of Hina Marsey, an eleven-year-old girl, who is diagnosed with leukemia. By exploring Hina's case, students develop conceptual models on cell growth/development, cancer, and cancer treatments. Students have opportunities for collaborative model building, discussions about health inequities in cancer, and evidence-based argumentation.

Presenters will model how to conduct a seminar discussion. Participants will engage in the seminar, which is based on a short article related to health inequity, as students. Participants will also have the opportunity to share and discuss how their SEPA projects touch on this important topic.

As a result of participating in this session, conference attendees will:

- gain a deeper understanding of how social issues affect health and medicine
- experience how seminar discussions on social issues can be done in a science classroom
- reflect on how the exploration of health disparities within a classroom can help students connect their science content to their own lives
- explore and share how other SEPA projects are addressing health disparities and social issues in health

Level: Advanced

Presenters:

Jeanne Chowning, PhD, Senior Director, Science Education, Fred Hutchinson Cancer Center  
Regina Wu, BA, Program Manager, Fred Hutchison Cancer Center

Strand: Curriculum Development; Broadening Participation – Curriculum Training Workshop  
Room: Ballroom C

### **How to Develop Science and Health Outreach Stories for All Ages**

The session will begin with a short overview of the power of science and health outreach stories in informal education and the process We Engage 4 Health uses to create and evaluate them. Participants will work in groups, each with a chosen health science topic, to identify three big ideas for a story, plan a story arc, and write a short script for a 3-panel, graphic-style story. Groups will exchange stories, read them out loud taking the parts of characters, and evaluate the stories using a story impact survey. If time permits, presenters will demonstrate putting one of the scripts into a graphic format using Comic Life software. Presenters will later put all group's scripts into a graphic format and e-mail attendees the resulting PDFs to help demonstrate how the story creation process plays out. Links to a story development guide and other resources will be provided.

As a result of participating in this session, Conference attendees will:

- become aware of the power of stories to help them accomplish goals in their own SEPA projects
- learn the components of successful stories
- begin the process of writing their own stories
- leave the session ready to continue developing their stories.

Level: Beginner

Presenters:

Susan Gertz, MS, Creative Development, Miami University  
Lauren Bates, PhD, Program Director for CRA Program We Engage 4 Health

Strand: Informal Science Education  
Room: Ballroom E

### **Stories from the Field: A Panel Discussion on SEPA Project Replication**

This session will help SEPA PIs and their teams initiate conversation about the potential for replicating their programs at broader scale. Four experienced SEPA project replication partnerships will share the stories of their efforts: the great, the not so great, and what they've learned along the way. Participants will have an opportunity to talk with panelists and each other as they consider their own potential for program growth.

As a result of participating in this session, conference attendees will:

- initiate conversations with their project teams about the potential for replication at broader scale
- gain insight into the pros and cons, ups and downs experienced by replication efforts already underway
- support SEPA's intent to disseminate successful projects more broadly via replication, as indicated in recent RFP guidelines

Level: Intermediate, Advanced

Panelists:

David H. Holben, PhD, Professor and Gillespie Distinguished Scholar of Nutrition and Hospitality

Management and Director of the Office of Food and Nutrition Security, The University of Mississippi

Melani Duffrin, PhD, RDN, Professor of Health Sciences, Northern Illinois University

Monica Strada, MAT, Science Teacher, research Triangle High School, Durham, North Carolina

Jane Disney, PhD, Associate Professor of Environmental Health and Director of Research Training, MDI Biological Laboratory

Amer Cesare, MEd, STEM Education Outreach Specialist, Penn State University

Tim Herman, PhD, Director, MSOE Center for BioMolecular Modeling, Milwaukee School of Engineering

Robin Bartlett, PhD, Professor and Associate Dean of Research, Capstone, College of Nursing, University of Alabama

Ann Chester, PhD, Senior Consultant, HSTA Hatch, panelist

Strand: Informal Science Education, Project Administration

Room: Roosevelt/Wilson

### **Professional Writing Groups: How to Start and Maintain a Collaborative (and fun) SciEd Writing Group to Support Project Dissemination**

Since SciEd 2021, a small group of us has been meeting virtually for an hour every other week to make progress on individual writing goals. Our writing group provides support, accountability, and camaraderie. In this session, you will experience a writing group just like we do it. After a brief description of our process, we'll introduce ourselves in small groups, set a short writing goal, and work individually. When we reconvene, we'll debrief on the experience, share tips for forming your own groups, and provide additional resources. Please come prepared with some writing you'd like to do or a writing idea (paper, report, social media writing) that you'd like to explore. We'll also discuss ways that participants can connect to create their own writing groups.

As a result of participating in this session, conference attendees will:

- learn how a writing group can help build a regular writing practice and support dissemination efforts
- experience one way to organize and manage a writing group
- receive resources about writing groups

- make progress on a writing project that participants bring with them to the session

Level: Beginner

Presenters:

Renee Bayer, MHSA, Associate Director for Engagement CREATE for STEM Institute, Michigan State University

Kristin M. Bass, Ph.D., Director of Research Development, Rockman et al Cooperative, Inc.

Strand: Research and Evaluation; Project Administration – Training Session

Room: Arlington/Cabin John

### **Systems Thinking Applications Across Multiple Distinct Fields**

Systems thinking is a branch of study that transcends almost any field of expertise, providing a common language and approach that can assist with the understanding and interpretation of ideas across multiple disciplines. By framing ideas in a systems context, we can gain insight and communicate understandings in a unique manner that may allow deeper discussion, discourse and dialog amongst practitioners in a variety of fields and amongst those with different educational backgrounds. As such, this session will briefly introduce some core concepts useful in systems thinking and engage participants in a number of activities and games that both reinforce and exemplify these concepts.

As a result of participating in this session, conference attendees will:

- learn and apply basic principles of systems thinking
- observe the applicability of systems thinking concepts in several disciplinary paradigms
- acquire several activities that can be applied within their own classroom and/or professional settings

Level: Beginner

Presenters and Facilitators:

Daniel M. Fernandez, PhD, Professor, California State University, Monterey Bay

Beth Callaghan, MS, Teacher Program Specialist, Monterey Bay Aquarium

Corin Slown, PhD, Associate Professor of Biology and Chemistry, California State University, Monterey Bay

Enid Ryce, MFA, Professor of Cinematic Arts and Technology, California State University, Monterey Bay

Strand: Science Teaching and Learning

Room: Ballroom D

Thursday, June 2. 2:00 – 3:15 PM

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### **Best Practices for Engaging Members of the Deaf Community in SciEd Programs: An Informal Discussion with Teresa Blankmeyer Burke, PhD**

Come participate in an informal discussion with Dr. Burke about best practices for engaging members of the Deaf community and individuals with other "disabilities" in science education programs. This session provides time for extended discussion with Dr. Burke after her keynote address.

As a result of participating in this session, conference attendees will:

- gain an understanding of best practices for engaging with and including members of the Deaf community in science education programs

Level: All

Presenter and Facilitator:

Teresa Blankmeyer Burke, PhD, Professor of Philosophy and Bioethicist, Gallaudet University  
Louisa A. Stark, PhD, Professor of Human Genetics and Director, Genetic Science Learning Center,  
University of Utah (facilitator)

Strand: Broadening Participation

Room: Ballroom D

### **Engaging Different Audiences in the Importance of Genetics and Genomics**

The American Society of Human Genetics has recently done several surveys to better understand the needs, limitations, and barriers to genetics and genomics in underserved populations. This session will highlight some of these findings and discuss how public programs that are part of the SciEd community can help increase awareness of the promise of the genetics and genomics revolution.

As a result of participating in this session, conference attendees will:

- learn about the public perception of genetics and genomics
- develop strategies to include diverse communities in the future promise of the genetics and genomics revolution

Level: All

Presenters and Facilitator:

Maurice Godfrey, PhD, Professor, University of Nebraska Medical Center  
Kara Flynn, Senior Director, Public Engagement, Communications, and Marketing, American Society of  
Human Genetics  
Rochelle Cassells, PhD, Assistant Director for Research and Evaluation, Genetic Science Learning Center,  
University of Utah  
Marnie Gelbart, PhD, Director of Programs, pgEd, Harvard University Medical School  
Charlie Wray, PhD, Vice President for Education, The Jackson Laboratory

Strand: Broadening Participation

Room: Ballroom C

### **Funding Opportunities from Federal Agencies**

In this session, experienced program officers from NSF, NIGMS, and the Department of Education will each describe the opportunities their programs offer for STEM education funding and support. Presentations will be followed by a facilitated question and answer session. The officers will provide information, brochures, and websites that will describe how the attendees can peruse the programs that will be presented from these agencies.

As a result of participating in this session, conference attendees will:

- gain information about science education funding opportunities available through NSF, the U.S. Department of Education, and NIH

Level: Beginner, Intermediate

Presenters and Facilitator:

Robert Russell, PhD, Program Director, National Science Foundation,

Christina Chhin, PhD, Program Officer-STEM Education, National Center for Education Research, Institute of Education Sciences, U.S. Department of Education,

Tony Beck, PhD, Program Director, Science Education Partnership Award (SEPA), and Interactive Digital Media STEM SBIR/STTR, Division for Research Capacity Building, National Institute of General Medical Sciences (NIGMS), NIH

Bethany Hornbeck, President and CEO, Apis Creative (facilitator)

Strand: Project Administration

Room: Latrobe

### **Conceptualizing and Evaluating Partnerships: Invitation to Discuss and Revise Tools (frameworks and instruments)**

For projects with a Science Education Partnership Award, healthy collaborations are essential. There is an increasing focus in US education on partnerships as promising means for science education improvement, whether they be research-practice partnerships, scientist-teacher partnerships, school-university partnerships, informal-formal partnerships, or some other arrangement that can be construed to be an alliance in service of mutual goals. Yet we don't always consider how to conceptualize and design partnership early in our planning beyond what is most logistically feasible for partners. Nor do we often discuss how to evaluate the actual partnership aspect of a SEPA in action. What is the nature of the work of the partners? How do the partners work together and what supports or constrains their work? What is important and unique about a SEPA partnership? What outcomes can we or might we expect from a SEPA partnership?

In this session, we invite SEPA projects to share and discuss the conceptualization and evaluation of partnerships themselves. We will begin by briefly sharing highlights from a literature review on education partnerships and science education partnerships specifically, to contextualize the ensuing discussion of frameworks and tools used to guide the initiation, implementation, and evaluation of partnerships. We will draw on the Representing Partnership Practice framework and others, to characterize SEPA projects and explore the relative costs and benefits of three types of partnerships: Connective, Generative, and Transformative. We will also lead a companion discussion on the potential value of studying partnerships that have 'failed'—either in their efforts to launch, their ability to meet

their goals, or to complete the work. The evaluation of and lessons learned from SEPA projects that didn't evolve as expected could help inform the design and support of future investments.

As a result of participating in this session, conference attendees will:

- consider and shape potential future directions for partnership evaluation, drawing on Coburn & Penuel's (2016) outline of the types of studies that would benefit the field of research-practice partnerships that are relevant to SEPA partnerships:
  - documentation of outcomes such as the growth in individual and partner capacities, including the capacity to scale innovation
  - comparative studies that show how partnership design matters for different outcomes, and what the relative costs and benefits are for particular partnership designs
  - targeted studies of strategies that go beyond identifying challenges to finding strategies that help partners address challenges
  - studies of the larger political dimensions of partnerships that reveal the role does the SEPA project play in the political contexts of the partners and what strategies help partners address their needs.

Level: Intermediate

Presenters:

Michelle Phillip, PhD, Senior Researcher and Founder, Phillips & Associates

Lindley McDavid, PhD, Senior Evaluation and Research Associate, Purdue University

Loran Carleton Parker, PhD, Associate Director, Principal Scholar, Evaluation and Learning Research Center, Purdue University

Strand: Research and Evaluation

Room: Arlington/Cabin John

### **Using Research Inside and Outside the Classroom to Increase Students' Interest in Science**

This breakout session will explore how research is utilized within and outside the classroom to increase students' interest in science. Topics to be covered include a discussion of common strategies utilized, benefits, challenges, and future directions related to engaging students in research. Specific examples of how research is incorporated into the SEPA network will also be highlighted.

As a result of participating in this session, conference attendees will:

- have a better appreciation of how to problem solve and successfully incorporate student research into their projects

Level: Beginner

Presenters:

Tony Ward, PhD, Professor and Chair, School of Public and Community Health Sciences, University of Montana

Derrick Scott, PhD, Dean, College of Natural and Health Sciences, Virginia State University

Robin Fuchs-Young, PhD, Professor of Molecular and Cellular Medicine, College of Medicine, and Director, Community Engagement Core, Texas A&M Center for Environmental Health Research

James Breeden, BBA, Management Information Systems, Operations Director, K-12 and Community Programs, Texas A&M University College of Medicine

Strand: Research Experiences for Students and Teachers

Room: Roosevelt/Wilson

### **Themed Session: Teacher Professional Development**

SHAPE MATTERS: Building Teachers' Capacity to Incorporate Authentic Modeling Practices That Mirror the Work of Molecular Biology Researchers in Secondary-level Science classrooms

The SHAPE MATTERS program is a collaboration between STEM education faculty and molecular biology researchers at Pennsylvania State University. The program leverages the modeling practices that these researchers utilize in their work and was designed to support teachers in better understanding the science practices included in the Next Generation Science Standards. In summer 2021, eight secondary-level teachers engaged in both modeling as a pedagogical practice as well as modeling as a technical research practice. Teachers worked through the molecular story of diabetes to examine the structure-function relationship of designer insulins. Then, teachers worked with research mentors to develop molecular stories using the modeling practices of the host lab. To provide teachers with experiences in communicating science, they prepared technical posters and generated 3-D printed models to convey the molecular stories of their host labs. Outcomes of the program included enhanced teacher understanding of modeling proteins both physically and computationally.

Presenters:

Kathleen Hill, PhD, CSATS Director and Associate Professor of Science Education, Pennsylvania State University Main Campus

Tiffany Lewis, MEd, STEM Education Specialist, Center for Science and the Schools, Pennsylvania State University

Amber Cesare, MEd, STEM Education Specialist, Center for Science and the Schools, Pennsylvania State University

The NH CREATES Teachers Institute: A Model of Professional Development for Middle and High School STEM Teachers

The NH CREATES Teachers Institute is a PD program that provides training to middle/high school STEM teachers to help them develop formal projects related to regenerative medicine and biotechnology (RM&B) using PBL. The Institute is one component of NH CREATES, an initiative to cultivate interest and expertise in RM&B among students and teachers to address current and future workforce needs.

Using UNH Tech Camp as a live learning lab, NH CREATES teachers interact with ongoing RM&B youth projects to determine areas of interest. Collaborating with fellow teachers, faculty and graduate student mentors, industry professionals and educational experts, participants work over two weeks to design their classroom projects. Teachers implement their projects during the school year and meet regularly with their cohort for ongoing support.

Four high school teachers, representing the areas of biology, physical science, STEAM, and biomedical science, participated in the 2021 NH CREATESTeachers Institute. Teachers developed projects on the



topics of cryopreservation, regrowing organs, and biomedical innovation. We will discuss the NH CREATES Teachers Institute model of PD and share highlights from the first cohort of teachers' RM&B classroom projects. We will share results from teacher surveys that explore how teachers integrated RM&B content into their projects.

Presenters:

Carmela Amato-Wierda, PhD, PI, NH CREATES the Future, University of New Hampshire  
Amy Booth, MEd, NH CREATES Project Director, University of New Hampshire  
Alison Allen, MEd, Project Evaluator, Rockman et al

Interventions to Support Teacher and Student Engagement in the Citizen Science Project "All About Arsenic" During the Covid-19 Pandemic.

Secondary schools in Maine and New Hampshire have been involved in a citizen science project called "All About Arsenic" aimed at addressing arsenic contamination of well water, one of the most pressing public health issues in these states. Arsenic exposure can cause cardiovascular disease, cancer, and reduced IQ in children. Many people are not aware of the issue and do not test and treat their well water. Addressing this issue in secondary science classrooms provides context for students to engage in scientific inquiry and improve data literacy while making a difference in their communities. The Covid-19 pandemic presented multiple challenges for teachers involved in this project, therefore, we implemented a series of interventions to support teachers during this time. In summer 2020, we moved our annual training for teachers online. We initiated weekly office hours with teachers to discuss additional needed adaptations to the program and developed a web-based Civic Action Toolkit and other supports for student outreach efforts. These modifications helped teachers motivate students, keep them engaged in science, and facilitate outreach to communities. In addition, we hosted focus groups to conduct project evaluation and research, which brought together faculty partners to share strategies and strengthen relationships.

Presenters:

Jane E. Disney, PhD, Associate Professor of Environmental Health and SEPA PI, MDI Biological Laboratory  
Kate Buckman, PhD, Research Scientist and SEPA coordinator, Dartmouth College  
Sarah Hall, PhD, Professor of Earth Science, College of the Atlantic  
Isidora Muñoz, Human Ecology Student, College of the Atlantic  
Anna Farrell, Digital Communications Specialist, MDI Biological Laboratory  
Abby Roche, Graduate Student in Environmental Communication, University of Maine  
Hannah Lust, PhD, Assistant Director of Research Training and SEPA Program Coordinator, MDI Biological Laboratory  
Karen Bieluch, PhD, Practice-based Learning Specialist and SEPA evaluator, Dartmouth College  
Bill Zoellick, Emeritus Educator and SEPA evaluator, Schoodic Institute  
Bruce Stanton, PhD, Professor of Microbiology and Immunology, Dartmouth Geisel School of Medicine

Strategies for Expanding Your Program's Teacher Network

What strategies are most effective at reaching more teachers for professional development? In-person professional development and conferences can be effective ways to connect teachers with new resources; however not all teachers have capacity to travel and spend time in-person. Genome Sciences Education Outreach will identify some strategies we have used to expand our teacher pool after developing online PD opportunities, as well as ways we've tried to expand our teacher network to

connect even more teachers with the GEMNet Curriculum and extension lessons. We are excited to learn about what has worked for other SEPA programs, and work towards developing best practices for efficient, equitable, and extensive dissemination of resources.

Presenters:

Atom Lesiak, PhD, Director of Education Outreach Genome Sciences, University of Washington  
Joan Griswold, MIT, Continuing Education Specialist, Genome Sciences Education Outreach, University of Washington

Strand: Teacher Professional Development

Room: Ballroom E

Friday, June 3. 8:30 – 9:45 AM

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### **Program Sustainment, Integrity and Continuity: Finding the Gaps**

When you find an educational model that works, how do you sustain it? How do you find the gaps and fill them in continuity of programming to keep STEM students moving on a career path. In this brainstorming event, we will exchange ideas about sustaining evidence-based programs with their integrity intact.

As a result of participating in this session, conference attendees will discuss:

- how programs are sustained beyond SEPA funding when evaluation shows their success
- how their quality is tested and maintained in sustainment
- how opportunity gaps are filled for program participants

Level: All

Presenters:

Debra Yourick, PhD, Director, Science Education and Fellowship Programs, Walter Reed Army Institute of Research  
Holly Brown, PhD, National Academy of Sciences, Engineering and Medicine Fellow, Walter Reed Army Institute of Research  
Laura Tenenbaum, PhD, ORISE Fellow, Walter Reed Army Institute of Research

Strand: Broadening Participation, Program Administration

Room: Ballroom E

### **Gamification to Engage Youth with Ecological Networks and Health Implications**

The session will actively engage participants in several dimensions of gamification of health-related science topics. First participants will play a hands-on, minds-on activity. The activity was adapted from a “tumbling tower” game for youth to explore a model of a food web system with various destabilizations (e.g. fire or hunter). Our Worlds of Connections SEPA project is focused on systems, systems models, and network science, therefore the goal of the activity is in part to learn basic network science concepts that are useful for understanding many complex systems. Second, participants will collectively learn about and use the basic principles of gamification of health science concepts as a tool for youth

exploration and discovery. In small groups, participants will extend the existing tumbling tower game to a new perturbation of the food web—e.g. insecticide or parasite to practice creating a fun game that allows youth to engage and discover topics. In partnership with the NE STEM 4U team, we have developed several games primarily for informal settings, but teachers also see value in the activities for formal classrooms. Participants will reflect upon how they could make games to engage youth in their SEPA projects.

As a result of participating in this session, conference attendees will:

- have a deeper understanding of the potential value—and challenges—involved in “gamification” of core concepts
- see how a Next Generation Science Standards (NGSS) cross-cutting concept such as “systems and system models” can be incorporated in a fun, interactive game designed primarily for learning in an informal setting
- have the beginning elements of a potential game to help youth learn about participants’ SEPA topics.

Level: All

Presenter:

Nik Stevenson, MS, STEM Professional Development Educator and Programs Coordinator, University of Nebraska at Omaha STEM TRAIL Center

Strand: Informal Science Education

Room: Arlington/Cabin John

### **Teaching the Genome Generation: Incorporating Data Analysis and Quantitative Skills into Biology Classrooms through Bioinformatics**

Math and data literacy are essential skills required for the current and future STEM workforce, yet research indicates that skill gaps exist in these areas among high school students. Furthermore, as genetic testing and genome sequencing technologies continue to become more sophisticated and more readily available to consumers, the current generation of students will need skills to interpret genetic data and understand its relevance to their own history, health, and life. Teaching the Genome Generation (TtGG) is a free professional development program that prepares pre- and in-service teachers to integrate molecular biology, bioinformatics, and ethics content into their high school biology classrooms. Newly designed NGSS-aligned activities emphasize data analysis and quantitative skills. Each activity, framed around concepts in genetics and genomics, focuses on problem-solving or inquiry through the exploration, analysis, and interpretation of data on publicly available databases. The new curricula also include investigations into ethics and social justice relevant to modern genetics and genomic technologies. In this workshop, participants will explore our new bioinformatics activities that emphasize quantitative and data literacy skills. Participants will also engage with TtGG teacher resources, including video and written tutorials detailing how to use publicly available databases, discussion notes, and digital tools.

As a result of participating in this session, conference attendees will:

- examine lessons and activities that teach high school quantitative and data literacy skills within a life science context

- use bioinformatics databases to investigate genetic diseases, obtain genetic and genomic information, and draw conclusions about the genetic basis of certain diseases
- utilize supporting resources and tools that are provided to high school teachers for implementation of our curriculum

Level: All

Presenters and Facilitators:

Sarah Wojiski, PhD, Director of Education, The Jackson Laboratory

Erica Gerace, PhD, Genomics Education Fellow, The Jackson Laboratory

Christina Vallianatos, PhD, Genomics Education and Outreach Program Manager, The Jackson Laboratory

Charlie Wray, PhD, Vice President of Education, The Jackson Laboratory

Strand: Curriculum Development – Curriculum Training Workshop

Room: Roosevelt/Wilson

### **Inclusive Measurement of Trainee Demographics within Biomedical Research Training Programs**

This session builds on a collaborative work from the NCI YES programs which explored programmatic approaches for measuring demographics among our programs. We identified large variability in how programs were measuring demographics when assessed by survey. Programs cited wanting guidance in how to measure demographics inclusively. This session will offer approaches for programs and use an interactive jamboard approach to surface questions, concerns, and considerations within demographic measurement.

As a result of participating in this session, conference attendees will:

- identify approaches for measuring demographics across gender, racial/ethnic, disability, and disadvantaged populations
- label emotions and concerns related to demographics measurement that will support development of frequently asked questions
- build a community of researchers interested in approaches for measuring inclusive demographics of biomedical trainees and considerations for reporting outcomes

Level: All

Presenters:

Sunita Chaudhary, PhD, Associate Professor of Surgery, and Director of Research Education, Robert Wood Johnson Medical School, Rutgers Cancer Institute of New Jersey

Karen Burns White, MS, Deputy Associate Director, Initiative to Eliminate Cancer Disparities, Dana-Farber/Harvard Cancer Center

Linda Kennedy, MEd, Associate Director for Strategic Initiatives and Global Oncology, Dartmouth Cancer Center

Megan Mekinda, PhD, Program Manager, University of Chicago

Lisa Marriott, PhD, Associate Professor, Oregon Health & Science University

Nathan Vanderford, PhD, Assistant Professor, University of Kentucky

Strand: Research and Evaluation

Room: Ballroom D and virtual\*

*\*This will be a hybrid session. You can attend in person or join with a laptop or device that connects online and allows you to participate.*

**Zoom:** <https://uchicagomedicine.zoom.us/j/97569084557?pwd=eFNoN0hDWVNJeTd5RHRGcjlNV3M3Zz09>

Meeting ID: 975 6908 4557 | Passcode: 64269411

### **Themed Session: Programs for Elementary Students and Teachers**

Implementing Professional Learning Communities (PLCs) in the Early Childhood Settings: Resources Developed, Lessons Learned, and the Path Forward

Professional Learning Communities (PLC) are gaining importance in the field of early childhood care and education.. This model of professional development is already popular in the K - 12 setting, however, very little is known about its utility and success with early childhood teachers. The purpose of this session is to describe the resources developed by the NIH SEPA-funded project, More PEAS Please!; discuss lessons learned through data collected during our needs assessment and pilot implementing PLCs in the Head Start setting while in a pandemic; and describe next steps. The team will also briefly discuss various PLCs models that have been successful in the field, which can be refined and replicated by others.

Presenters:

Archana V. Hegde, PhD, BK, Professor, East Carolina University

Virginia C. Stage, PhD, RDN, More PEAS Please! PI, Associate Professor of Nutrition Science, East Carolina University

Jocelyn Dixon, BS, More PEAS Please! Project Coordinator, Nutrition Science, East Carolina University

Strand: Teacher Professional Development

Authentic Community Engagement in Sciences Strikes Again!

The Authentic Community Engagement in Sciences group works with rural and underserved school districts to develop 5th grade science curricula centered on local health issues. These curricula highlight pathways to locally relevant health care careers, and are accompanied by a unique biochemistry demonstration show called The Atomic Circus. We are currently working to better understand the impact of this type of educational intervention in rural and native communities throughout eastern Montana.

Presenter:

Matt Queen, PhD, Assistant Professor of Chemistry, Montana State University Billings

Strands: Curriculum Development, Informal Science Education, Interactive Multimedia

Biomechanics to Develop Interdisciplinary Experiences in Early Elementary Science: Exploring Informal Education and Community Based Learning

Central to the field of Biomechanics is the connection between biological systems (plant, animal, fungi etc.) and mechanics (physics, engineering, technology) which leads to a large variety of applications and incorporates all avenues of STEM. Biomechanics, with its focus on the body in motion, is well suited to help young students (who are naturally curious about their own and animal bodies) to make sense of themselves and their surrounding environment. Additionally, research suggests that participation in informal (out-of-school) science learning is a critical motivator for children to pursue STEM careers. Through collaborating with the Omaha Children’s Museum and Henry Doorly Zoo and Aquarium we aim to empower informal educators to ultimately impact young students identify as “doers” of STEM through the development and implementation of culturally inclusive biomechanics-based inquiry-based learning activities. Informal educators will complete professional training that draws on the well-known “funds of knowledge” framework which positions teachers and practitioners as learners of students to uncover the wealth of resources families possess that can be leveraged to develop a sequence of culturally inclusive and inquiry-based science lessons called Next Generation Science Standards (NGSS) Storylines.

Presenter:

Amelia Lanier Knarr, Ph., Instructor, Outreach Coordinator, University of Nebraska at Omaha

Strand: Informal Science Education

Climate Club: Environmental Health Research Education for Young Citizen Scientists

We Engage 4 Health (WE4H) is a health outreach project working with communities in southern Ohio. In summer 2021, we were approached by a community partner interested in teaching elementary-school children in a summer program about the impact of the environment on resident’s health and involve them in collecting environmental data as citizen scientists. To create this program, we adapted materials from existing WE4H programs that were originally developed for middle school through adult ages to create a 6-week Climate Club. WE4H programs feature graphic-style stories that participants read out loud as the characters followed by discussion and related activities. For Climate Club, we used selected stories from our Health is Happenin’ RAP program, our Citizen Science RAP program, and training materials for our environmental health data collection tool called Eyewitness Community Survey (ECS). Topics included how to pose research questions, how to collect and present data, and the impact of heat islands and air quality on health. Hands-on activities included testing filtration materials, graphing candy color.

Presenters and Facilitators:

Lauren Bates, Program Director for Community Research Advocates, We Engage 4 Health

Susan Gertz, MS, WE4H Creative Development, Miami University

Strand: Informal Science Education

Room: Latrobe

Friday, June 3. 10:00 – 11:15 AM

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**Explore the National Science Teaching Association’s (NSTA) High Quality Lesson Plans for Implementing the Next Generation Science Standards (NGSS)**

NSTA's Daily Do sensemaking lessons are designed to engage students in authentic, relevant science learning. Join us to explore how these phenomenon-driven lessons motivate students to engage in science and engineering practices to make sense of science ideas (disciplinary core ideas) they need to explain how or why the phenomenon occurs. Experience the critical attributes of sensemaking exemplified in Daily Do lessons that can be applied to create and/or shift lessons to be aligned with NGSS.

As a result of participating in this session, conference attendees will:

- explore how phenomenon-driven lessons motivate students to engage in science and engineering practices to make sense of science ideas
- understand the critical attributes of sensemaking
- discuss strategies for implementing Daily Do sensemaking lessons
- learn how to partner with NSTA for increased impact

Level: Beginner, Intermediate

Presenters:

Erika Shugart, PhD, Executive Director, National Science Teaching Association

Wendy Binder, MS, Program Director, STEM Professional Learning, National Science Teaching Association

Strand: Curriculum Development

Room: Roosevelt/Wilson

### **DNA Barcoding in a Pandemic: Hands-on Techniques for Remote Learning**

Citizen DNA Barcode Network (CDBN) equips visitors to science and nature centers to use DNA barcoding to inventory ant, beetle, and mosquito species as part of national campaigns. The COVID-19 pandemic limited participation in onsite CDBN events at collaborating facilities, as many were forced to close to the public. In response, the DNA Learning Center (DNALC) adapted our school-based DNA barcoding infrastructure to home-based citizen science, where nature enthusiasts received kits to extract and amplify specimen DNA. In this session, participants will perform simple, at-home versions of our Chelex DNA isolation and amplification procedures to help identify organisms collected during CDBN bioblitz events, demonstrating that authentic, hands-on scientific experiences can be conducted nearly anywhere.

Complementing this activity, participants will learn how DNA barcode sequences can identify a species using a LEGO® “sequencer” developed by collaborators at the Earlham Institute in Norwich, UK. This sequencer reads colored LEGO® blocks—representing DNA barcode sequences—which can be identified in live time using bioinformatics, making the concept accessible to a broad audience.

A follow-up virtual bioinformatics workshop will allow participants to identify their samples using online tools developed by the DNALC.

As a result of participating in this session, conference attendees will:

- isolate and amplify DNA from invertebrates using a rapid method that can be performed at home

- learn how DNA sequence can be used to identify a species using well known construction toys as a teaching tool for a challenging concept
- identify their specimen during follow-up virtual bioinformatics training
- observe how hands-on science experiences can be made accessible for at-home learning

Level: Beginner

Presenter:

Sharon Pepenella, PhD, Manager, Student and Public Research, Cold Spring Harbor Laboratory, DNA Learning Center

Strand: Informal Science Education – Training Session

Room: Ballroom C

### **STEM Storytelling Bootcamp: Meet Your Project Coach**

Telling your project's story is key to partnerships, engagement and funding. In this interactive session, we will dissect Youth Media Reporting on STEM issues and programs to learn the basics of story development, building characters, scripting and how to find your story's beginning middle and end. You will then outline your project's best story elements and figure out how to communicate the value of your work.

As a result of participating in this session, conference attendees will:

- come away with a story outline that can be turned into a video about your program
- understand what video to capture and people to interview to bring your project's mission to life

Level: All

Presenters:

Leah Clapman, BA, Executive Director, PBS NewsHour

Mohanned Pasha, Youth Media Producer, PBS NewsHour Student Reporting Labs

Strand: Interactive Multimedia

Room: Arlington/Cabin John

### **Authentic Research Experiences for Students and Teachers in Faculty Labs and Citizen Science**

This interactive breakout session will utilize a modified Round Table discussion format. Participants will explore successful strategies for engaging (1) students and (2) teachers in authentic research activities and also for (3) incorporating community members in student-led, local field research (citizen science) along with teachers and students. Involving community, especially family members, fosters a better understanding of the range of STEM careers available to the students, and how to support these pursuits.

Session participants will break into 3 groups, based on interest, with time to participate in 2 of 3 tables.

- Table 1. Teacher research -Tony Ward
- Table 2. Student research - Robin Fuchs-Young and James Breeden



- Table 3. Citizen science - Involving community members in student-lead research on topics of community interest/benefit - Derrick Scott

As a result of participating in this session, conference attendees will:

- gain knowledge and skills to facilitate attainment of the overall goals of research activities:
  - to increase student self-efficacy for and knowledge about a range of scientific, research and health careers
  - to enhance teacher knowledge of the skills and competencies that students will need to be successful in post-secondary education and preparatory training for a variety of scientific and medical professions
  - to enhance community understanding of EHS research through participation in hands-on investigations.

Level: All

Facilitators:

Robin Fuchs-Young, PhD, Professor, College of Medicine, Texas A&M University

James Breeden, BBA, K-12 Outreach Program, Operations Manager, College of Medicine, Texas A&M University

Derrick Scott, PhD, Dean, college of Natural and Health Sciences, Virginia State University

Tony Ward, PhD, Professor and Chair, School of Public and Community Health Sciences, University of Montana

Strand: Research Experiences for Students and Teachers

Room: Ballroom E

### **Curriculum “Lemonade Stands”**

1. The Mystery of the Monkeyflower: Explore a Biology High School Curriculum through a Comic Book and Real-World Research

The Mystery of the Monkeyflower is a high school NGSS-aligned, project-based learning unit that has a unique twist - an embedded comic and authentic field science research that guides students to figure out how gene-environment interactions affect living organisms. Comics and field science research in the classroom are not entirely unique on their own, but we believe combining these two experiences embedded in a high school unit provides a novel learning experience for students. In this session, participants will explore and experience parts of the monkeyflower unit and discuss how these different parts combine to take students on a journey of science discovery of gene-environment interactions using a driving question flow-chart, comics and real-world plant science. After experiencing parts of the unit, we'll discuss partnering with an evolutionary biologist to develop the unit, and introducing STEM careers to broaden student participation. We will discuss successes and challenges from this first year pilot in high school classrooms. There will be an open discussion for all participants to share experiences with using comics and or real-world research in curriculum.

Presenter:

Renee Bayer, MA, Principal Investigator, CREATE for STEM Institute, College of Education, Michigan State University

## 2. More PEAS Please! Engaging Preschool Head Start Children in the Process of Science

The NIH SEPA-funded project, More Preschool Education in Applied Sciences (PEAS) Please!, has developed an innovative multi-component professional development program focused on teaching preschool educators how to design and guide effective, practice-based learning experiences that teach science and develop language within the context of healthy living. Resources include: (1) a 1.5-day workshop, (2) 6 on-demand learning modules (online and paper-based); (3) 16 white-board training videos; (4) a PEAS Teaching Guide featuring 16 Model Science Learning activities; and (5) a Supplemental Professional Learning Community guide. Materials can be downloaded for free from [www.morepeasplease.org](http://www.morepeasplease.org).

Presenter:

Jocelyn Dixon, BS, More PEAS Please! Project Coordinator, East Carolina University

## 3. The Adaptive Immunity Kit and Making the Cut,.. with CRISPR

We have developed two hands-on kits that model different aspects of CRISPR-based genome editing. The Adaptive Immunity Kit introduces students to CRISPR as an adaptive immunity system in bacteria. The Making the Cut Kit explores the molecular mechanism whereby CRISPR Cas9 is able to recognize a 20-nucleotide long sequence .... and make a double-stranded cut.

Presenters:

Tim Herman, PhD, Director, MSOE Center for BioMolecular Modeling, Milwaukee School of Engineering  
Heather Ryan, CEO 3D Molecular Designs

## 4. Blood Sugar Balance

The Blood Sugar Balance web-game was developed as an extension of the GEMNet curriculum in partnership with Blank Space. The game began as a hands-on modeling activity, that no longer worked during the switch to online education. As we adapted the model activity, elements of volitional decision making was added to enhance learner engagement, eventually leading to full-on game development. In this game, players score points for maintaining a healthy blood glucose level, while making food and exercise choices. They must play the role of the pancreas releasing hormones (or use medical insulin if playing as a person with Type 2 Diabetes). It can be used for formal or informal education. Gameplay allows for acquisition of game data that allows for players to reflect upon the interplay of diabetic status, life choices, and access to resources.

Presenters:

Atom Lesiak, PhD, Director of Education Outreach, Genome Sciences, University of Washington  
Joan Griswold, MIT, Continuing Education Specialist, Genome Sciences Education Outreach, University of Washington

## 5. Discover SCIENCE with Dr. Bear

Discover SCIENCE (a Scientific Creative Innovative Engaging New Cool Experience) with Dr. Bear engages children and families in the out-of-school time setting of community libraries and afterschool programs in hands-on, inquiry-based art, and science programs that help to improve the physical, cognitive, and social development of children and their families. SCIENCE explores and combines STEM with a focus on

health issues of concern to the community such as asthma, stress, cardiometabolic risk, sleep, genetics and genetic diseases, and injury prevention. In this session we will share the complete activity guidebook and related website links and animated videos.

Presenters:

Naomi Luban MD, PI of Dr. Bear, Children's National Hospital  
Rachel Smilow, MA, Program Lead, Children's National Hospital  
Julia Miller, MS, Program Coordinator, Children's National Hospital  
Annika Hvide, MA, Program Assistant, Children's National Hospital

Strand: Curriculum Development

Room: Ballroom A/B

6. The Scientist Spotlights Initiative: Teaching Science Content through Curricular Supplements that Feature Counter-stereotypical Scientists and Engage Students with Written Reflections

The Scientist Spotlights Initiative aims to empower science instructors with inclusive science curricula as a means for students of all backgrounds to envision themselves in science. The Scientist Spotlight assignment links students to resources about counter-stereotypical scientists and their research as an alternative method of delivering course content. Studies have shown that Scientist Spotlight assignments enhance students' relatability to scientists and improves science learning. Visit us to learn more about Scientists Spotlights, search over 400 student-authored assignments on the newly launched website, and discover ways to integrate Scientist Spotlights in your educational context.

Presenters:

Dax Ovid, PhD, Postdoctoral Fellow, San Francisco State University  
Lucy Luong, SEPAL Administrator, San Francisco State University  
Kimberly Tanner, Professor, San Francisco State University, Co-PI  
Jeff Schinske, Professor, Foothill College, Co-PI

7. Biotinkering Activity Resources for Families, Educators, and Institutions

Since 2016, we have been working to establish various systems and concepts that allow kids to explore, tinker, create, and problem solve with biology. Come explore the materials that we have created so far to help others do biotinkering in a variety of venues! These resources can help you replicate our biotinkering activities or be used as inspiration to design your own versions that leverage our foundational R&D. We will have finalized resources for at-home activities and classroom lesson plans as well as in-progress resources for facilitated science center experiences. Let's get biotinkering!

Presenters:

Anja Scholze, PhD, Program Director, Biology + Design, The Tech Interactive  
James Wong, BA, Content Specialist, The Tech Interactive  
Caitlin Nealon, PhD, Life Sciences Experience Developer, The Tech Interactive  
Abbey Thompson, PhD, Director, Educational Outreach, Stanford University

8. Frontiers in Cancer Research

Frontiers in Cancer Research, a program developed by the Science Education Partnership at Fred Hutchinson Cancer Research Center, increases understanding of molecular and cellular biology and how scientific practices such as argumentation and sensemaking are used in research.

We will be sharing the two cancer-focused units that we developed in partnership with teachers and scientists. These materials are NGSS-aligned and highlight the research at Fred Hutch including immunotherapy and stem cell transplantation. The Intro to Cancer: Leukemia and Hina's Story Unit investigates the case of Hina Marsey, an eleven-year-old girl, who is diagnosed with leukemia. By exploring Hina's case, students develop conceptual models on cell growth/development, cancer, and cancer treatments. In the more advanced Immunotherapy Unit, students are introduced to a case study featuring Kristin K., a woman diagnosed with a treatment-resistant form of leukemia and for whom a stem cell donor match could not be found. This unit focuses on the topic of cancer, leukemia, and immunotherapies and includes an in vitro CRISPR lab activity.

Presenters:

Regina Wu, BA, Program Manager, Fred Hutchison Cancer Center

Jeanne Chowning, PhD, Senior Director – Science Education, Fred Hutchison Cancer Center

Kristen Bergsman, PhD, Curriculum Design Project Lead, Fred Hutchinson Cancer Center

Strand: Curriculum Development

Room: Ballroom A/B

## Posters

### Poster Presentation Day/Time

- **Odd Numbered Posters:** Poster Session 1, Wednesday, June 1, 4:00-5:00pm
- **Even Numbered Posters:** Poster Session 2, Thursday, June 2, 4:00-5:00pm

*Note: Several poster numbers do not appear in the list due to changes made after poster number assignments were made. That is, several poster numbers were removed, but no changes were made in the assigned poster sessions.*

Poster Number	First Author	Institution/Organization	Poster Title
<b>Big Data</b>			
1	Stephen Koury	Jacobs School of Medicine and Biomedical Sciences, University at Buffalo	The Metagenomics Education Partnership: Harnessing the Power of Microbial Genome Sequencing and Big Data with High School Students and Teachers
2	Neil Lamb	HudsonAlpha Institute for Biotechnology	Filtered – Discover Bioinformatics and Save the World!
3	Jessica Siltberg-Liberles	Florida International University	The Authentic Bioinformatics in the Classroom (ABC) Project: Integrating Bioinformatics in High School Biology
<b>Broadening Participation</b>			
4	Rebecca Rudd	University of Kentucky	START Program for Underrepresented Populations
5	Chloe Cheung	Health Resources in Action	Change as the Constant: The LEAH Knox Scholars Program Response to Two years of a Pandemic
6	Sam Chuisano	University of Michigan	MYHealth: Training the Next Generation of Health Researchers
7	William Folk	University of Missouri	Instruction with Multimodal STEM Text Sets Significantly Strengthens Diverse Middle School Students' NGSS and CCSS-ELA Shared Practices in Argumentation
8	Maurice Godfrey	University of Nebraska Medical Center	Encouraging Excellence: Health Science Education in Native American Communities
9	Berri Jacque	Tufts University School of Medicine	The Great Diseases: Bridging biomedical career exploration, competency building and mentoring
10	Oswaldo Morera	University of Texas at El Paso	Project ACE Teacher Experiences in Summer Research
11	Katherine Nielsen	University of California San Francisco Science & Health Education Partnership	Teen Wellness Connection: Constructing a Community of Teen Health Science Leaders
12	Sandra San Miguel	Purdue University College of Veterinary Medicine	See Us-Be Us: Inspiring Future Veterinarians Using a Veterinary STEM Ecosystem

13	Bryan Shaw	Baylor University	Increasing access to chemistry for high schoolers with blindness: a program to jump start Central Texas
<b>Citizen Science</b>			
14	Jane Disney	MDI Biological Laboratory	The public health impact of an NIH SEPA school-based citizen science effort to address arsenic contamination of drinking water in rural Maine and New Hampshire
15	Catherine Morton	Health Sciences & Technology Academy	Emerging From the Storm HSTA students address health issues with sensitivity to COVID concerns
16	Sharon Pepenella	Cold Spring Harbor Laboratory DNA Learning Center	Citizen DNA Barcode Network: A Community-based Infrastructure for Monitoring Biodiversity and Disease Vectors.
17	Orestes Quesada	University of Puerto Rico San Juan	University of Puerto Rico STEM Asthma Awareness Program
<b>Curriculum Development</b>			
18	Dalton Allen	University of Kansas Medical Center	TSCORE LIFT: Teachers & Students for Community Oriented Research & Education, Linking Industry, Faculty, & Teachers
19	Renee Bayer	CREATE for STEM Institute Michigan State University	Health in Our Hands: Building and sustaining student engagement in genomic and environmental health sciences through a community-school partnership
20	Dana Haine	University of North Carolina at Chapel Hill	Building the capacity of STEM teachers to use an emerging environmental health issue (PFAS contamination of drinking water) to engage ALL learners
21	Nancy Moreno	Baylor College of Medicine	New Model to Teach Science Specific Disciplinary Literacy in Elementary School: The Authentic Literacy and Language (ALL) for Science Project
22	Dax Ovid	San Francisco State University	Scientist Spotlight Assignments Shift Students' Relatability to and Descriptions of Scientists in a Multi-Institutional Study
23	Elizabeth Parker	University of Maryland School of Medicine	Addressing vaccine hesitancy in Baltimore City through a youth engagement/health literacy STEM initiative
25	Ailea Stites	University of Chicago	Hexacago Health Academy 2.0: A social justice science program to increase interest in STEM and health careers among youth of color
26	Regina Wu	Fred Hutchinson Cancer Center	Frontiers in Cancer Research
<b>Early STEM</b>			

27	Jacqueline Genovesi	The Academy of Natural Sciences of Drexel University	Seeds to STEM
28	Virginia Stage	East Carolina University	More PEAS Please! Lessons Learned on the Journey to Bridge the Gap Between Preschool and K-12 Science Learning Experiences
<b>Informal Science Education</b>			
29	Naomi Luban	Children's National Hospital	Discover SCIENCE with Dr. Bear
30	Maya Adam	Stanford University	Using animated video storytelling to scale health education across diverse populations
31	Danielle Alcena-Stiner	University of Rochester School of Nursing, and Life Sciences Learning Center (LSLC), University of Rochester Medical Center, School of Medicine and Dentistry	One Health Education: Promoting Environmental Health Literacy Through Virtual Field Trip Programs
32	Marie Barnard	University of Mississippi	Project SCORE (Student Centered Outcomes Research Experience) – A Student-Developed Research Agenda
33	Alexa Burnett	University of Georgia	Adaptation of the FoodMASTER Middle Grades Curriculum for use in Georgia 4-H after-school programming
34	Maribel Campos	University of Puerto Rico, Medical Sciences Campus	Semilla: a Transdisciplinary Community Based STEM Program
35	Leah Clapman	WETA/PBS NewsHour	Health Literacy - PBS NewsHour & Student Reporting Labs
37	Susan Gertz	Miami University	Community Engagement and Learning with Graphic-Style Health Science Stories
38	Emonie Hall	Walter Reed Army Institute of Research	In-School Enrichment Programs in Underserved Schools Using the Near-Peer Mentor Model
39	David Holben	The University of Mississippi	The Deep South Network: Take-home Food-Based STEM Education Program in rural Appalachian Mississippi
40	Michelle Johnson	University of Alabama at Birmingham	BioBridge: A novel near-peer mentoring experience increases learning in undergraduate students
41	Sharon Locke	Southern Illinois University Edwardsville	Exploring Evidence of Adolescent Science Interest Development
43	Julia McQuillan	University of Nebraska - Lincoln	Worlds of Connections SEPA: Spreading knowledge and excitement about network science for health
44	Cecilia Nguyen	Oregon Museum of Science & Industry	AlegreMENTE: Celebrando Conexiones Tempranas / Happy Brain: Celebrating Early Connections

45	Jeb Owen	Washington State University	Creativity as an Engine for Understanding Infectious Disease – HEAL Project Curriculum Overview and Hands-On Activity
46	Kevin D. Phelan	University of Arkansas for Medical Sciences	ArkanSONO Response to the Pandemic: Using Virtual Outreach to Broaden Participation and Build New Partnerships
47	Anja Scholze	The Tech Interactive	Biohealth Learning Lab and Makerspace for the Community
48	Laycca Umer	New York Hall of Science	Learning from our community about the racially inequitable impacts of COVID-19
49	Lisa White	University of California Museum of Paleontology	VENOM-venture/A-VENENO-tura: Early results and design strategies from an immersive, serious game for families
<b>Interactive Multimedia</b>			
50	Amir Attia	California State University, Monterey Bay	Utilizing Interactive Technologies and Gamification to Improve Students' Mental Health and Learning Qualities in STEM Education.
51	Atom Lesiak	University of Washington	The Making of the Web Game: Blood Sugar Balance
52	James Lester	North Carolina State University	Health Quest: Engaging Adolescents in Health Careers with Technology-rich Personalized Learning
53	John A. Pollock	Duquesne University	Mindfulness, Meditation, and Multimedia
54	Louisa Stark	University of Utah	Developing and Testing Click-through vs. Work-through Versions of a PCR Virtual Lab
55	Charles Wood	Wheeling University	Natural Disasters & Health in the Midst of Covid
<b>Research &amp; Evaluation</b>			
56	Ellen Chenoweth	University of Alaska	Launching one-health research on home shores
57	Joan Griswold	University of Washington	From Modeling Glucose to the Microbiome: Making connections through Type 2 Diabetes
58	Lindley McDavid	Purdue University	Findings of a Pilot Program Focused on Building Vaccine Knowledge and Positive Attitudes using Podcasts in a Small Sample of Youth and Families from Diverse Backgrounds
59	Chaojie Shang	University of North Carolina at Greensboro	Gender Preference in Motivation and Learning
<b>Research Experiences for Students &amp; Teachers</b>			
61	Ido Davidesco	University of Connecticut	Making BrainWaves: Engaging Students in Neuroscience Investigations with Portable Brain Technologies



62	Regina Idoate	University of Nebraska Medical Center	Making Connections: The University of Nebraska Medical Center Youth Enjoy Science Program
63	Ralph Imondi	Integrative Biosciences Program at Coastal Marine Biolabs	NeuroLab: adopting a storyline-based approach to translate an ISE experience for high school course integration
65	Kate Mattern	Anaconda High School	PHAGES: Phages Helping Acquire Genuine Experiences in Science
66	Anjan Nan	University of Maryland Eastern Shore	A Hands-on Biomedical Research Training Summer Camp with a Focus on COVID-19 for Underserved Minority High School Students
67	David Petering	University of Wisconsin-Milwaukee	Learning and Discovery in Experimental Environmental Health Science: On the Path from Data to Knowledge
68	Teresa Schiff-Elfalan	University of Hawaii, Hawaii/Pacific Basin Area Health Education Center	The CIRCLE Program: A distance research opportunity for students underrepresented in science and health careers
69	Gwendolyn Stovall	University of Texas at Austin	High School Research Initiative Expansion Project: University Research-based Inquires for Rural Classrooms
70	Nathan Vanderford	University of Kentucky Markey Cancer Center	The Appalachian Career Training In ONcology (ACTION) Program
71	Tony Ward	University of Montana School of Public and Community Health Sciences	Improving Population Health Through Air Quality and Cardiovascular Health Education in Rural Communities
72	Chery Whipple	Colby-Sawyer College and New Hampshire Academy of Science	Learning Science Through Research
73	Kristine Wylie	Washington University	Bioinformatics research using existing data sets: remote programs for high school students during the pandemic
<b>Rural STEM</b>			
74	Roger Sloboda	Dartmouth College	Dartmouth Rural STEM Educator Partnership
75	Jamie Cornish	Montana State University	A Model for INBRE to Reach Underserved Youth
77	Robin Bartlett	The University of Alabama	Health Science & Technology Academy - Alabama
79	Melinda Gibbons	University of Tennessee, Knoxville	Imagining Possibilities - Year 2
80	Courtney Martin	University of Kentucky	Assessing Cancer Literacy and Risk Behaviors among Appalachian Kentuckians through an Oral History Approach
<b>Student Science Enrichment</b>			
81	Daniel Fernandez	California State University, Monterey Bay	ESTA: Environmental Science Through the Arts project rollout

82	Aaron Kyle	Columbia University	Hk Maker Lab Virtual Summer Design Camp
83	Orestes Quesada	University of Puerto Rico San Juan	University of Puerto Rico STEM Asthma Awareness Program
84	Patrice Saab	University of Miami, Department of Psychology	UQUEST: Questioning, Understanding, Experiencing, and Scientific Thinking
85	Abha Verma	Xavier University of Louisiana	Xavier University of Louisiana's-Mobile Outreach for Laboratory Enrichment (XULA-MOLE)
<b>Teacher Professional Development</b>			
86	Carmela Amato-Wierda	University of New Hampshire	The NH Collaborative for Regenerative Medicine Education and Training for Engineers and Scientists of the Future
87	Katie Busch Chandran	University of Alabama at Birmingham	Virtual compared to in-person inquiry based education of teachers
88	Kathleen Hill	Pennsylvania State University	Teachers' Design of Molecular Stories: Outcomes of a Two-Week Long Protein Modeling Professional Development Workshop
89	Hilleary Osheroff	Exploratorium	The Phenomenal Genome: Evolving Public Understanding of Genetics in the Post-Mendelian Era
90	Rob Rockhold	University of Mississippi Medical Center	Science Teaching Excites Medical Interest (STEMI) – Trajectory and Impact
91	Sarah Wojiski	The Jackson Laboratory	Teaching the Genome Generation: Cultivating High School Genomics Through Teacher Education
92	Tim Herman	MSOE Center for Biomolecular Modeling	The Science and Ethics of Genome Engineering
<b>Late-Breaking Posters</b>			
93	Melani Duffrin	Northern Illinois University	The FoodMASTER Initiative Deep South Network: Impacting STEM education learning environments with food-based activities
94	Gregory J. Gage	Backyard Brains	Backyard Brains: Curriculum and Tools for Bringing Advanced Neuroscience Research Methods to K12

## Common Acronyms & Abbreviations

### HHS – U.S. Department of Health & Human Services

AHRQ	Agency for Healthcare Research and Quality
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare & Medicaid Services
FDA	U.S. Food and Drug Administration
HRSA	Health Resources & Services Administration
IHS	Indian Health Service
NIH	National Institutes of Health
PHS	Public Health Service
	<ul style="list-style-type: none"> <li>• SAMHSA – Substance Abuse and Mental Health Services Administration</li> </ul>

### NIH – National Institutes of Health

- ICs – NIH Institutes and Centers

Abbreviation	Code	NIH Institutes
NCI	CA	National Cancer Institute <ul style="list-style-type: none"> <li>• YES – Youth Enjoy Science Research Education Program</li> </ul>
NEI	EY	National Eye Institute
NHLBI	HL	National Heart, Lung, and Blood Institute
NHGRI	HG	National Human Genome Research Institute <ul style="list-style-type: none"> <li>• Genome – commonly used name for NHGRI</li> </ul>
NIA	AG	National Institute on Aging
NIAAA	AA	National Institute on Alcohol Abuse and Alcoholism
NIAID	AI	National Institute of Allergy and Infectious Diseases
NIAMS	AR	National Institute of Arthritis and Musculoskeletal and Skin diseases
NIBIB	EB	National Institute of Biomedical Imaging and Bioengineering
NICHD	HD	Eunice Kennedy Shriver National Institute of Child health and Human Development
NIDCD	DC	National Institute on Deafness and Other Communication Disorders
NIDCR	DE	National Institute of Dental and Craniofacial Research
NIDDK	DK	National Institute of Diabetes and Digestive and Kidney Diseases
NIDA	DA	National Institute on Drug Abuse
NIHES	ES	National Institute of Environmental Health Sciences
NIGMS	GM	National Institute of General Medical Sciences
NIMH	MH	National Institute of Mental Health
NIMHD	MD	National Institute on Minority Health and health Disparities

NINDS	NS	National Institute of Neurological Disorders and Stroke
NINR	NR	National Institute of Nursing Research
NLM	LM	National Library of Medicine
<b>NIH Centers</b>		
CC		NIH Clinical Center
CIT		Center for Information Technology
CSR		Center for Scientific Review <ul style="list-style-type: none"> <li>• CSR manages the annual SEPA and SEPA SBIR/STTR STEM Games reviews</li> </ul>
FIC		Fogarty International Center
NCATS	TR	National Center for Advancing Translational Sciences <ul style="list-style-type: none"> <li>• CTSA – Clinical and Translational Science Awards</li> </ul>
NICCIH		National Center for Complementary and Integrative Health

### **NIGMS – National Institute of General Medical Sciences**

<b>DRCB – Division for Research Capacity Building</b>	
Dr. Ming Lei, Director	
IDeA	Institutional Development Awards <ul style="list-style-type: none"> <li>• INBRE – IDeA Networks of Biomedical Research Excellence</li> <li>• COBRE – Centers of Biomedical Research Excellence</li> <li>• IDeA Program Infrastructure for Clinical and Translational Research (IDeA-CTR)</li> <li>• STTR Regional Technology Transfer Accelerator Hubs for IDeA States</li> </ul>
NARCH	Native American Research Centers for Health
SCORE	Support of Competitive Research Program
SEPA	<b>Science Education Partnership Award</b> Program
<b>TWD – Division of Training, Workforce Development, and Diversity</b>	
Dr. Alison Gammie, Director	
Bridges	Bridges to the Baccalaureate
	Bridges to the Doctorate
BUILD	Building Infrastructure Leading to Diversity
	Career Development Awards
IMSD	Initiative for Maximizing Student Development
IRACDA	Institutional Research and Academic Career Development Awards
K99 --> R00	Pathway to Independence Award
MARC U*STAR	Undergraduate Student Training in Academic Research
NRMN	National Research Mentoring Network
NRSA-Fs	Individual Predoctoral National Research Service Award Fellowships

NRSA-F32	Individual Postdoctoral National Research Service Award
NRSA-T32	Institutional Predoctoral National Research Service Award
PREP	Postbaccalaureate Research Education Program
RISE	Research Initiative for Scientific Enhancement

### NIH Grant-Associated Terms

AOR	Authorized Organization Representative
ASSIST	Application Submission System & Interface for Submission Tracking
COI	Conflict of Interest
DUNS	Data Universal Numbering System
EIN	Entity Identification Number
F & A	Facilities and Administrative Costs (also referred to as Indirect Costs)
FOA	Funding Opportunity Announcement
FOIA	Freedom of Information Act
FSR	Financial Status Report (SF-269 or 269A)
FTE	Full-Time Equivalent
GMO	Grants Management Officer
GMS	Grants Management Specialist
JIT	Just-In-Time
NoA	Notice of Award
PA	Program Announcement
PAR	Program Announcement Reviewed in an Institute
PO	Program Official
RFA	Request For Applications (Grants)
RPPR	Research Performance Progress Report
SBIR	Small Business Innovation Research
SRG	Scientific Review Group
SRO	Scientific Review Officer
STTR	Small Business Technology Transfer

### NSF – National Science Foundation

- EHR – Education and Human Resources

DRL – Research on Learning in Formal and Informal Settings	
AISL	Advancing Informal STEM Learning
ATE	Advanced Technological Education
CSforAll:RPP	Computer Science for All
DR-K12	Discovery Research PreK-12
ECR	EHR Core Research

ITEST	Innovative Technology Experiences for Students and Teachers
S&CC	Smart and Connected Communities
STEM+C	STEM + Computing K-12 Education
<b>America's Seed Fund</b>	
EA	Educational Technologies and Applications <ul style="list-style-type: none"> <li>• STEM Games SBIR/STTR</li> </ul>

**Other Federal Agencies Involved in STEM Education**

ED	U.S. Department of Education <ul style="list-style-type: none"> <li>• IES – Institute of Education Sciences</li> <li>• STEM Games SBIR/STTR</li> </ul>
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
USDA	United States Department of Agriculture <ul style="list-style-type: none"> <li>• NIFA – National Institute of Food and Agriculture</li> </ul>