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### **NIH SciED 2017 Conference Organizing Committee:**

*Kristin Bass, PhD, Rockman et al*

*Judy Brown, PhD, Patricia & Phillip Frost Museum of Science*

*Ann Chester, PhD, West Virginia University*

*Theresa Gillespie, PhD, MA, Emory University School of Medicine*

*Lisa Marriott, PhD, Oregon Health & Science University*

*Rob Rockhold, PhD, University of Mississippi Medical Center*

*Robert Russel, PhD, Division on Research & Learning, EHR, National Science Foundation*

*Louisa Stark, PhD, University of Utah*

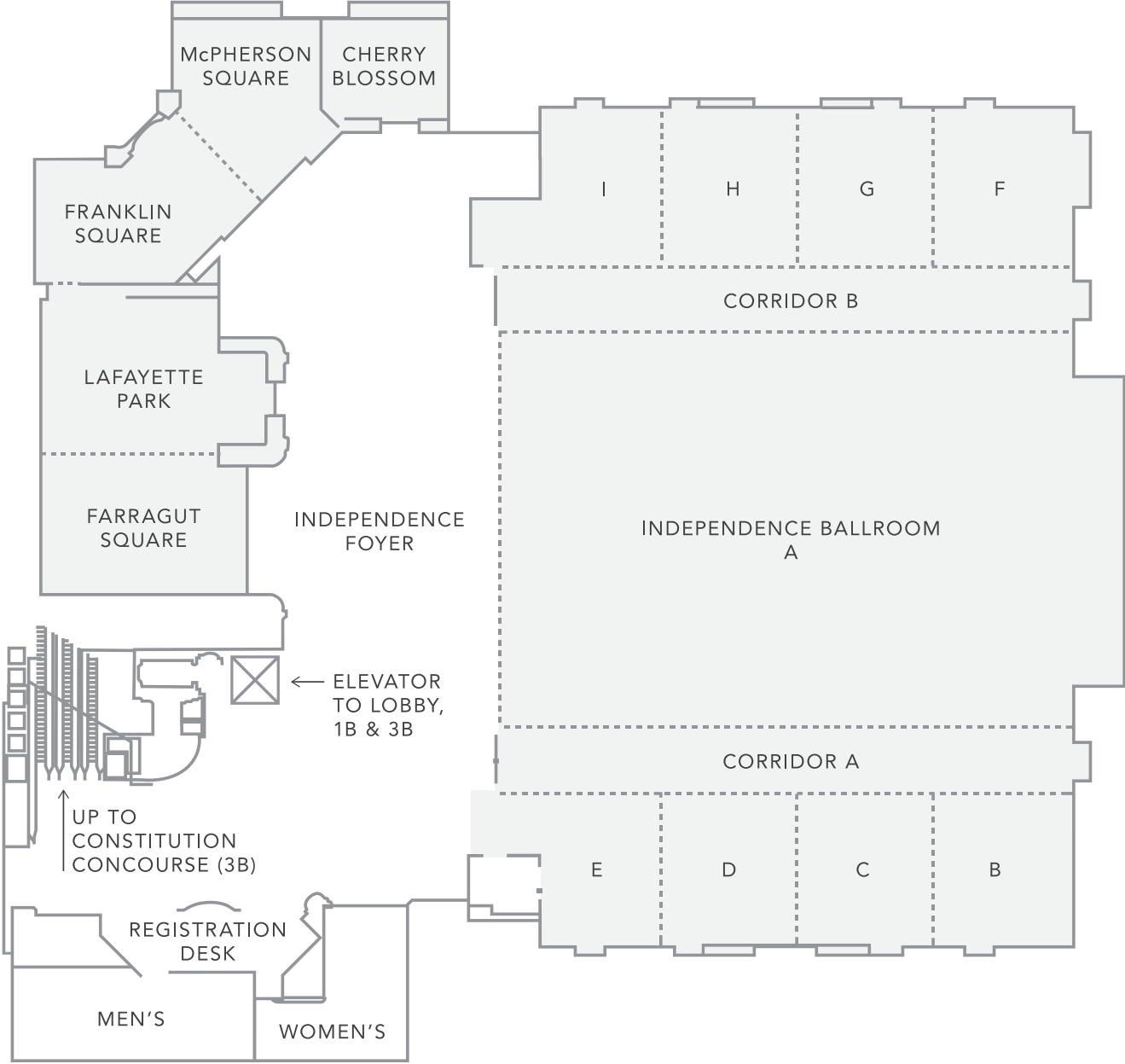
*Jennifer Ufnar, PhD, Vanderbilt University*

*J. Michael Wyss, PhD, University of Alabama at Birmingham*

### Conference Support:

Funding for this conference was made possible in part by Cooperative Agreement 1U13OD021319 from the Office of Research Infrastructure (ORIP), Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI), Office of the Director, the National Institutes of Health. The views expressed in written conference materials or publications and by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services; nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

# VENUE MAP



# EVENT SCHEDULE

## **NIH SciEd 2017: Annual Conference for NIH Science Education Projects**

Grand Hyatt Washington

1000 H Street NW, Washington, DC

May 30 – June 2, 2017

All sessions will meet in **Independence Ballroom A (Independence Level, 5B)**, unless otherwise noted.  
**Breakout session rooms are on the same level.**

**Twitter:** [#SCIEd2017](https://twitter.com/SCIEd2017)

**WiFi Access Code:** scied2017

**Conference Evaluation:** <https://www.research.net/r/SciEd2017>

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### TUESDAY, MAY 30

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5:30–7:30 **Conference Check-in and Networking Reception**

Grand Foyer (Declaration Level, 1B)

**Poster Set-up**

Independence Ballroom A (Independence Level, 5B)

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### WEDNESDAY, MAY 31

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7:15–8:30 Breakfast

7:30–8:30 Late Conference Check-in and Poster Set-up

8:30–8:40 **Welcome**

Louisa A. Stark, PhD

Chair, NIH SciEd 2017 Conference Organizing Committee, Professor of Human Genetics, Director of Genetic Science Learning Center, University of Utah

**Welcome Letter from U.S. Senator Thad Cochran (R-MS)**

Rob W. Rockhold, PhD, Professor of Health Sciences, Deputy Chief Academic Officer, University of Mississippi Medical Center

8:40–9:40 **Keynote Address: NIGMS Education and Training Programs**

Jon R. Lorsch, PhD, Director, National Institute of General Medical Sciences (NIGMS), NIH

9:40–10:00 Break

10:00–11:00 **Keynote Address: Enhancing Genomic Literacy: Rationale, Opportunities, and Challenges**

Eric D. Green, MD, PhD, Director, National Human Genome Research Institute (NHGRI), NIH

11:00–12:00 **Update on the SEPA Program**

L. Tony Beck, PhD, Science Education Partnership Award (SEPA), Center for Research Capacity Building, National Institute of General Medical Sciences (NIGMS), NIH

**Overview of the SEPA Process Evaluation**

Jill Feldman, PhD, Senior Study Director, Westat

- 12:00–1:30 Lunch
- Mentor-Mentee groups meet for newly-funded SEPA projects**  
See list of assigned tables  
Room: Franklin Square/McPherson Square
- 1:30–1:45 Poster set-up in breakout rooms – ONLY set session A posters on tables
- 1:45–2:45 **Poster Session A – even-numbered posters**
- Authentic Research Experiences for Students & Teachers**  
Room: Independence F/G
- Curriculum Development**  
**Early STEM**  
Room: Farragut Square
- Informal Science Education**  
Room: Lafayette Park
- Student Science Enrichment**  
**Rural STEM**  
Room: Franklin Square/McPherson Square
- Teacher Professional Development**  
Room: Independence A (use round tables in rear, left-hand corner)
- 2:45–3:00 Take down even-numbered posters; set up odd-numbered posters
- 3:00–4:00 **Poster Session B – odd-numbered posters**
- Authentic Research Experiences for Students & Teachers**  
Room: Independence F/G
- Curriculum Development**  
**Early STEM**  
Room: Farragut Square
- Informal Science Education**  
Room: Lafayette Park
- Student Science Enrichment**  
**Rural STEM**  
Room: Franklin Square/McPherson Square
- Teacher Professional Development**  
Room: Independence A (use round tables in rear, left-hand corner)
- 4:00–4:15 Break; Return all posters to the tables in Independence A
- 4:15–5:30 **Concurrent Breakout Sessions**
- Working with Populations Suspicious of Science**  
Facilitators: Maurice Godfrey, Marnie Gelbart  
Panelists: Carla Easter, Sara Chandros Hull, Erik Stegman, Tiffany Powell-Wiley  
Strand: Equity, Diversity, and Health Disparities  
Room: Lafayette Park

**Understanding and Measuring STEM Career Development**

Presenters: Erin Hardin, Melinda Gibbons

Strand: Research and Evaluation

Room: Franklin Square/McPherson Square

**But How Well Does It Work? Immersing High School Students in a Research-Design-Evaluate Cycle to Learn About Health Messaging**

Presenter: Rebecca Smith

Strand: Science Teaching and Learning; Research and Evaluation

Room: Farragut Square

**Curriculum Development and the NGSS: Connecting Science Learning with the Lived World of Our Students**

Presenters: Barbara Hug, Brian Reiser, Idit Adler, Irene Bayer, Joseph Krajcik

Strand: Science Teaching and Learning

Room: Independence F/G

**Effective Professional Development Design and Implementation: What do Teachers Need and Want?**

Facilitators: Jennifer Ufnar, Charlie Wray

Panelists: Rosemary Riggs, Claudeen Denning, Christine Ziese, Stephanie Dumont

Strand: Teacher Professional Development

Room: Independence A

**Resources Available from National Science Foundation STEM Education Resource Centers**

Presenters: Robert Russell, Jamie Bell

Strand: Project Administration

Room: Independence I

**Commercializing your SEPA**

Facilitator: Michael Wyss

Presenters: Dina Markowitz, Melissa Gilliam, Andrij Holian

Strand: Project Administration

Room: Independence H

Dinner on your own

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**THURSDAY, JUNE 1**

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7:15–8:30 Breakfast

**Meeting for all new SEPA PIs**

L. Tony Beck, PhD, Science Education Partnership Award (SEPA), Center for Research Capacity Building, National Institute of General Medical Sciences (NIGMS), NIH

Room: Franklin Square/McPherson Square

8:30–10:00 **Developing Assessments that Elicit Learners' Thinking, Knowledge and Skills**

Joseph Krajcik, PhD, Lappan-Phillips Professor of Science Education; Director, CREATE for STEM Institute, College of Natural Science and College of Education, Michigan State University

Barbara Hug, PhD, Clinical Associate Professor, College of Education, University of Illinois at Urbana-Champaign

10:00–10:15 Break

- 10:15–10:35 ***NIHSEPA.org: A Website for the SEPA Community***  
 Nancy Moreno, PhD, Associate Provost for Faculty Development and Institutional Research; Professor, Allied Health Sciences and Family & Community Medicine, Baylor College of Medicine
- 10:35–11:00 ***The Trans-NIH Native American Research for Health Program***  
 Sheila A. Caldwell, PhD, Program Director, Center for Research Capacity Building, National Institute of General Medical Sciences (NIGMS), NIH
- 11:00–12:00 ***Keynote Address: Rigorous Design, Rigorous Research: Inventing the Future of Learning with Design-Based Research***  
 Christopher Hoadley, PhD, Associate Professor of Educational Communication and Technology, Program in Digital Media Design for Learning, and Program on Games for Learning. New York University
- 12:00–1:30 Lunch
- 1:30–2:45 ***Concurrent Breakout Sessions***
- Models for Building Relationships with Students and Communities That Support Science Learning and Success***  
 Panelists: Ann Chester, Angie Millan, Maurice Godfrey, Kelley Withy, Sheila Caldwell  
 Strand: Equity, Diversity, and Health Disparities  
 Room: Farragut Square
- Discussion with Christopher Hoadley on Design-Based Research***  
 Moderator: Judy Brown  
 Presenter: Christopher Hoadley  
 Strands: Research and Evaluation; Informal Science Education  
 Room: Lafayette Park
- Evaluating Teacher Professional Development: Insights from Three SEPA Projects***  
 Facilitator: Dina Drits-Esser  
 Panelists: Paula Cupertino, Berri Jacque, Karina Meiri, Michele Shuster, Christopher Villa  
 Strand: Research and Evaluation; Teacher Professional Development  
 Room: Independence A
- Establishing a Basic Genomic Literacy Framework for K-16 Students***  
***(Note: This is a double session, 1:30–4:15)***  
 Facilitators: Beth Tuck, Carla Easter, Bryony Ruegg, Daphne Rickard, Pat Miller, Neil Lamb, Laura Bonetta  
 Strand: Science Teaching and Learning  
 Room: Independence F/G
- Science of Learning: How do SEPA Projects Incorporate Theories of Learning into Curriculum?***  
 Facilitators: Jennifer Ufnar, Kristin Bass, Rob Rockhold  
 Strand: Science Teaching and Learning  
 Room: Franklin Square/McPherson Square
- Big Data in STEM Learning***  
 Facilitator: Mike Wyss  
 Presenters: Patrice Capers, David Micklos, Chuck Wood

Strand: Science Teaching and Learning  
Room: Independence H

**Planning Competitive National Science Foundation Proposals**

Presenter: Robert Russell  
Strand: Project Administration  
Room: Independence I

2:45–3:00 Break

3:00–4:15 **Concurrent Breakout Sessions**

**STEM Relationship Pipelines: A Core Component of Long-Term Impact**

Panelists: Michael Kennedy, Peter Crown, Lisa Marriott, Marlys Witte  
Strand: Equity, Diversity, and Health Disparities  
Room: Independence A

**Bilingual Exhibitions and Community Leader Dialogues in Rural Colorado Libraries**

Presenters: Anne Holland, Jennifer Hellier, Robert Russell  
Strand: Equity, Diversity, and Health Disparities; Informal Science Education  
Room: Farragut Square

**Engaging a Pipeline from SEPA to IDeA Programs**

Facilitators: Tony Ward, Krishan Arora  
Panelists: Ann Chester, Marisa Pedulla, Kelley Withy, Michele Shuster, Maurice Godfrey  
Strand: Equity, Diversity, and Health Disparities  
Room: Independence I

**The Evolution of the “How We Role” Evaluation: Lessons Learned from Four Iterations of Learning Assessments**

Presenters: Loran Carleton Parker, Sandra San Miguel, Lindley McDavid, Wilella Burgess, Adri-  
anne Fisch  
Strand: Research and Evaluation”  
Room: Lafayette Park

**Establishing a Basic Genomic Literacy Framework for K-16 Students  
(Note: This is a double session, 1:30–4:15)**

Facilitators: Beth Tuck, Carla Easter, Bryony Ruegg, Daphne Rickard, Pat Miller, Neil Lamb,  
Laura Bonetta  
Strand: Science Teaching and Learning  
Room: Independence F/G

**A Discussion of Science Identity Formation: Methods by Which Persons Find Their Space  
in STEM**

Facilitator: Rob Rockhold  
Presenters: Namandjé N. Bumpus, Jon VanDeventer  
Strand: Science Teaching and Learning  
Room: Independence H

**Connecting Current Research to the Next Generation Science Standards**

Presenters: Hilleary Osheroff, Kristina Yu  
Strand: Teacher Professional Development; Science Teaching and Learning  
Room: Franklin Square/McPherson Square



4:15–5:30 **Networking Reception: Demonstrations of Games, Apps and Technology-Based Educational Materials**  
*Grand Foyer (Declaration Level, 1B)*

Dinner on your own

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FRIDAY, JUNE 2

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7:15–8:30 Breakfast

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

***Tried and True Evaluation Instruments***

Facilitators: Lisa Marriott, Kristin Bass

Strand: Research and Evaluation

Room: *Independence H*

***Personal Data Trackers in STEM Education***

Presenters: Carla Romney, Donald DeRosa, Carl Franzblau, Kelly Nguyen, John Craven

Strand: Science Teaching and Learning

Room: *Farragut Square*

***Have a BLAST with DNA Subway's Blue Line***

Presenters: David Micklos, Sharon Pepenella

Strand: Science Teaching and Learning

Room: *Independence A*

***Game-Based Learning 101: Introduction to Game Design, Formal Systems, and Rules***

Presenter: Ashlyn Sparrow

Strand: STEM Games for Learning

Room: *Independence F/G*

***Stories from the Field: Institutional Challenges in IHE- ISE Partnerships***

Facilitators: Judy Brown, Robert Russell

Strand: Informal Science Education

Room: *Lafayette Park*

***Best Practices in Professional Development: What SEPA Grantees Have Learned from K-12 Teachers and Students***

Presenters: Charles Wray, Karina Meiri, Georgia Hodges, Barbara Hug, Marissa Pedulla, Mary Jo Koroly

Strand: Teacher Professional Development

Room: *Franklin Square/McPherson Square*

9:45–10:00 Break

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

***Diabetes, Obesity, and Cardiovascular Disease (DOC) Working Group***

Facilitators: Melani Duffrin, Ann Chester

Strand: Equity, Diversity, and Health Disparities

Room: *Lafayette Park*

***Monitoring the Alignment of Program Objectives to Instruments: How to be an Evaluation Auto Mechanic***

Presenters: Kristin Bass, Dina Drita-Esser

Strand: Research and Evaluation

Room: Independence F/G

***Approaches to Evaluating Authentic Research Experiences***

Presenters: Lindsay Barone, Preeti Gupta

Strand: Research and Evaluation

Room: Independence A

***Strategies for Integrating Disciplinary Literacy into Science and Health Curriculum***

Presenters: Alana Newell, Nancy Moreno, Christopher Burnett

Strand: Science Teaching and Learning

Room: Franklin Square/McPherson Square

***Student-Produced "Question-Framed Videos" and Science Identity Formation }***

Presenters: Peter Crown, Marlys Witte

Strand: Science Teaching and Learning

Room: Farragut Square

***Getting Started in STEM Games***

Facilitator: Lisa Marriott

Panelists: Georgia Hodges, Brinley Kantorski

Strand: STEM Games for Learning

Room: Independence H

11:15–11:45 ***Town Hall Discussion***

L. Tony Beck, PhD, Science Education Partnership Award (SEPA), Center for Research Capacity Building, National Institute of General Medical Sciences (NIGMS), NIH

Lunch on your own

***Please complete the conference evaluation at: <https://www.research.net/r/SciEd2017>***

# BREAKOUT SESSIONS

## • SUMMARY BY DAY •

### WEDNESDAY 4:15–5:30 PM

<b>Title</b>	<b>Strand</b>	<b>Location</b>
Working With Populations Suspicious of Science	Equity, Diversity, and Health Disparities	Lafayette Park
Understanding and Measuring STEM Career Development	Research and Evaluation	Franklin Square/ McPherson Square
But How Well Does it Work? Immersing High School Students in a Research-Design-Evaluate Cycle to Learn About Health Messaging	Science Teaching and Learning; Research and Evaluation	Farragut Square
Curriculum Development and the NGSS: Connecting Science Learning With the Lived World of Our Students	Science Teaching and Learning	Independence F/G
Effective Professional Development Design and Implementation: What do Teachers Need and Want?	Teacher Professional Development	Independence A
Resources Available from National Science Foundation STEM Education Resource Centers	Project Administration	Independence I
Commercializing your SEPA	Project Administration	Independence H

### THURSDAY 1:30–2:45 PM

<b>Title</b>	<b>Strand</b>	<b>Location</b>
Models for Building Relationships With Students and Communities That Support Science Learning and Success	Equity, Diversity, and Health Disparities	Farragut Square
Discussion with Christopher Hoadley on Design-Based Research	Research and Evaluation; Informal Science Education	Lafayette Park
Evaluating Teacher Professional Developments: Insights from Three SEPA Projects	Research and Evaluation; Teacher Professional Development	Independence A
Establishing a Basic Genomic Literacy Framework for K-16 Students	Science Teaching and Learning	Independence F/G
Science of Learning: How do SEPA Projects Incorporate Theories of Learning Into Curriculum?	Science Teaching and Learning	Franklin Square/ McPherson Square

Big Data in STEM Learning	Science Teaching and Learning	Independence H
Planning Competitive National Science Foundation Proposals	Project Administration	Independence I

**THURSDAY 3:00–4:15 PM**

<b>Title</b>	<b>Strand</b>	<b>Location</b>
STEM Relationship Pipelines: A Core Component of Long-Term Impact	Equity, Diversity, and Health Disparities	Independence A
Bilingual Exhibitions and Community Leader Dialogues in Rural Colorado Libraries	Equity, Diversity, and Health Disparities; Informal Science Education	Farragut Square
Engaging a Pipeline from SEPA to IDeA Programs	Equity, Diversity, and Health Disparities	Independence I
The Evolution of the “How We Role” Evaluation: Lessons Learned From Four Iterations of Learning Assessments	Research and Evaluation	Lafayette Park
Establishing a Basic Genomic Literacy Framework for K-16 Students	Science Teaching and Learning	Independence F/G
A Discussion of Science Identity Formation: Methods by Which Persons Find Their Space in STEM	Science Teaching and Learning	Independence H
Connecting Current Research to the Next Generation Science Standards	Teacher Professional Development	Franklin Square/ McPherson Square

**FRIDAY 8:30–9:45 AM**

<b>Title</b>	<b>Strand</b>	<b>Location</b>
Tried and True Evaluation Instruments	Research and Evaluation	Independence H
Personal Data Trackers in STEM Education	Science Teaching and Learning	Farragut Square
Have a BLAST with DNA Subway’s Blue Line	Science Teaching and Learning	Independence A
Game-Based Learning 101: Introduction to Game Design, Formal Systems, and Rules	STEM Games for Learning	Independence F/G
Stories from the Field: Institutional Challenges in IHE- ISE Partnerships	Informal Science Education	Lafayette Park
Best Practices in Professional Development: What SEPA Grantees Have Learned from K-12 Teachers and Students	Teacher Professional Development	Franklin Square/ McPherson Square

**FRIDAY 10:00–11:15 AM**

<b><i>Title</i></b>	<b><i>Strand</i></b>	<b><i>Location</i></b>
Diabetes, Obesity, and Cardiovascular Disease (DOC) Working Group	Equity, Diversity, and Health Disparities	Lafayette Park
Monitoring the Alignment of Program Objectives to Instruments: How to be an Evaluation Auto Mechanic	Research and Evaluation	Independence F/G
Approaches to Evaluating Authentic Research Experiences	Research and Evaluation	Independence A
Strategies for Integrating Disciplinary Literacy into Science and Health Curriculum	Science Teaching and Learning	Franklin Square/ McPherson Square
Student-Produced "Question-Framed Videos" and Science Identity Formation	Science Teaching and Learning	Farragut Square
Getting Started in STEM Games	STEM Games for Learning	Independence H

# BREAKOUT SESSIONS

## • SUMMARY BY STRAND •

### EQUITY, DIVERSITY, AND HEALTH DISPARITIES

<b>Title</b>	<b>Time</b>	<b>Location</b>
Working with Populations Suspicious of Science	Wednesday, 4:15-5:30	Lafayette Park
Models for Building Relationships with Students and Communities That Support Science Learning and Success	Thursday, 1:30-2:45	Farragut Square
STEM Relationship Pipelines: A Core Component of Long-Term Impact	Thursday, 3:00-4:15	Independence A
Bilingual Exhibitions and Community Leader Dialogues in Rural Colorado Libraries	Thursday, 3:00-4:15	Farragut Square
Engaging a Pipeline from SEPA to IDeA Programs	Thursday, 3:00-4:15	Independence I
Diabetes, Obesity, and Cardiovascular Disease (DOC) Working Group	Friday, 10:00-11:15	Lafayette Park

### RESEARCH AND EVALUATION

<b>Title</b>	<b>Time</b>	<b>Location</b>
Understanding and Measuring STEM Career Development	Wednesday, 4:15-5:30	Franklin Square/ McPherson Square
But How Well Does It Work? Immersing High School Students in a Research-Design-Evaluate Cycle to Learn About Health Messaging	Wednesday, 4:15-5:30	Farragut Square
Discussion with Christopher Hoadley on Design-Based Research	Thursday, 1:30-2:45	Lafayette Park
Evaluating Teacher Professional Development: Insights from Three SEPA Projects	Thursday, 1:30-2:45	Independence A
The Evolution of the “How We Role” Evaluation: Lessons Learned from Four Iterations of Learning Assessments	Thursday, 3:00-4:15	Lafayette Park
Tried and True Evaluation Instruments	Friday, 8:30-9:45	Independence H
Monitoring the Alignment of Program Objectives to Instruments: How to be an Evaluation Auto Mechanic	Friday, 10:00-11:15	Independence F/G
Approaches to Evaluating Authentic Research Experiences	Friday, 10:00-11:15	Independence A

## SCIENCE TEACHING AND LEARNING

<b>Title</b>	<b>Time</b>	<b>Location</b>
But How Well Does It Work? Immersing High School Students in a Research-Design-Evaluate Cycle to Learn About Health Messaging	Wednesday, 4:15-5:30	Farragut Square
Curriculum Development and the NGSS: Connecting Science Learning with the Lived World of Our Students	Wednesday, 4:15-5:30	Independence F/G
Establishing a Basic Genomic Literacy Framework for K-16 Students	Thursday, 1:30-4:15	Independence F/G
Science of Learning: How do SEPA Projects Incorporate Theories of Learning into Curriculum?	Thursday, 1:30-2:45	Franklin Square/ McPherson Square
Big Data in STEM Learning	Thursday, 1:30-2:45	Independence H
A Discussion of Science Identity Formation: Methods by Which Persons Find Their Space in STEM	Thursday, 3:00-4:15	Independence H
Connecting Current Research to the Next Generation Science Standards	Thursday, 3:00-4:15	Franklin Square/ McPherson Square
Personal Data Trackers in STEM Education	Friday, 8:30-9:45	Farragut Square
Have a BLAST with DNA Subway's Blue Line	Friday, 8:30-9:45	Independence A
Strategies for Integrating Disciplinary Literacy into Science and Health Curriculum	Friday, 10:00-11:15	Franklin Square/ McPherson Square
Student-Produced "Question-Framed Videos" and Science Identity Formation	Friday, 10:00-11:15	Farragut Square

## STEM GAMES FOR LEARNING

<b>Title</b>	<b>Time</b>	<b>Location</b>
Game-Based Learning 101: Introduction to Game Design, Formal Systems, and Rules	Friday, 8:30-9:45	Independence F/G
Getting Started in STEM Games	Friday, 10:00-11:15	Independence H

## TEACHER PROFESSIONAL DEVELOPMENT

<b>Title</b>	<b>Time</b>	<b>Location</b>
Effective Professional Development Design and Implementation: What do Teachers Need and Want?	Wednesday, 4:15-5:30	Independence A
Evaluating Teacher Professional Development: Insights from Three SEPA Projects	Thursday, 1:30-2:45	Independence A

Connecting Current Research to the Next Generation Science Standards	Thursday, 3:00-4:15	Franklin Square/ McPherson Square
Best Practices in Professional Development: What SEPA Grantees Have Learned from K-12 Teachers and Students	Friday, 8:30-9:45	Franklin Square/ McPherson Square

### INFORMAL SCIENCE EDUCATION

<b><i>Title</i></b>	<b><i>Time</i></b>	<b><i>Location</i></b>
Discussion with Christopher Hoadley on Design-Based Research	Thursday, 1:30-2:45	Lafayette Park
Bilingual Exhibitions and Community Leader Dialogues in Rural Colorado Libraries	Thursday, 3:00-4:15	Farragut Square
Stories from the Field: Institutional Challenges in IHE- ISE Partnerships	Friday, 8:30-9:45	Lafayette Park

### PROJECT ADMINISTRATION

<b><i>Title</i></b>	<b><i>Time</i></b>	<b><i>Location</i></b>
Resources Available from National Science Foundation STEM Education Resource Centers	Wednesday, 4:15-5:30	Independence I
Commercializing your SEPA	Wednesday, 4:15-5:30	Independence H
Planning Competitive National Science Foundation Proposals	Thursday, 1:30-2:45	Independence I



# BREAKOUT SESSIONS

## • DESCRIPTIONS •

WEDNESDAY, MAY 31 4:15 – 5:30 PM

### ***Working With Populations Suspicious of Science***

Four community and NIH experts will discuss models to build relationships with communities with historical suspicions of science. They will describe approaches to break down barrier and increase participation in science and health activities and education. Most of the session will be an open discussion with attendees.

**Level:** All

**Facilitators:**

Maurice Godfrey, PhD, Professor, University of Nebraska Medical Center  
Marnie Gelbart, PhD, Harvard Medical School

**Panelists:**

Sara Chandros Hull, PhD, Chair, NHGRI Institutional Review Board  
Carla L. Easter, PhD, Chief, Education and Community Involvement Branch,  
National Human Genome Research Institute  
Tiffany Powell-Wiley, MD, MPH, Assistant Clinical Investigator, Social Determinants of  
Obesity and Cardiovascular Risk, National Heart, Lung, and Blood Institute  
Erik Stegman, JD, Executive Director, Center for Native American Youth, Washington, D.C.

**Room:** Lafayette Park

### ***Understanding and Measuring STEM Career Development***

The presenters, both social scientists who study career choice and career development, will (a) provide a brief overview of major theories of vocational development, (b) discuss and provide examples of how these theories inform our own SEPA project and could inform others' efforts to promote interest in STEM careers, and (c) discuss and provide examples of theoretically-based, well-validated, existing measures of constructs such as math-science self-efficacy, STEM interest, beliefs in the value of pursuing a STEM degree, etc. — proximal outcomes that might be useful and important indicators of the impact of various SEPA projects.

**Level:** Beginner

**Presenters:**

Erin Hardin, PhD, Professor, University of Tennessee  
Melinda Gibbons, PhD, Associate Professor, University of Tennessee

**Room:** Franklin Square/McPherson Square

### ***But How Well Does it Work? Immersing High School Students in a Research-Design-Evaluate Cycle to Learn About Health Messaging***

San Francisco Health Investigators engages high school students in a year-long project to study knowledge, awareness, and attitudes of health issues in students' communities. In this research-design-evaluate cycle, students first conduct formative research to inform the design of targeted health messages. The messages are then evaluated for effectiveness using intercept surveys in a randomized trial design. Participants in this session will use students' formative data to build a learning progression on a health topic. After viewing

students' health messages, participants will review message evaluation data and provide feedback on strategies to measure message effectiveness.

**Level:** All

**Presenter:** Rebecca Smith, PhD, Co-Director, UCSF Science & Health Education Partnership, University of California San Francisco

**Room:** Farragut Square

### ***Curriculum Development and the NGSS:***

#### ***Connecting Science Learning With the Lived World of Our Students***

The adoption and implementation of the Next Generation Science Standards (NGSS) challenge us as curriculum developers to support teachers and students in making sense of phenomena, as a foundation of science teaching and learning. In this session, we focus on identifying ways to address shifts in science learning necessitated by the Framework for K-12 Science Education and the NGSS. Using curriculum materials being developed through our SEPA projects, we highlight how students use the NGSS practices, crosscutting concepts and disciplinary core ideas to make sense of phenomena and solve real world problems across the K-12 grades. We address how artifacts created by students engaging with these materials can be used to assess students' developing understanding of science used to make sense of the real world and their future lives in it.

**Level:** Beginner & Intermediate

**Presenters:**

Barbara Hug, PhD, Clinical Associate Professor, University of Illinois

Brian Reiser, PhD, Professor, Northwestern University

Idit Adler, PhD, Research Associate, Michigan State University

Joseph Krajcik, PhD, Professor, Michigan State University

**Room:** Independence F/G

### ***Effective Professional Development Design and Implementation: What do Teachers Need and Want?***

In this session, a panel of 3-5 classroom teachers will work with SEPA attendees to give insight into effective professional development from the trenches. Teachers will talk about effective professional development experiences firsthand, and will give SEPA attendees a better idea of how to structure effective PD for maximum teacher and student benefit.

**Level:** All

**Facilitators:**

Jennifer A. Ufnar, PhD, Senior Research Associate/Director, Vanderbilt University

Charlie Wray, PhD, Director, The Jackson Laboratory

**Panelists:**

Rosemary Riggs, Program Coordinator, UT Health Science at San Antonio

Claudeen Denning, MS, STEM Teacher, Rose Park Middle School

Christine Ziese, Teacher, UT Health Science Center at San Antonio

Stephanie Dumont, Teacher, Brunswick High School

**Room:** Independence A

## **Resources Available from National Science Foundation STEM Education**

### **Resource Centers**

This informal session will provide a walk-through of the rich informal and formal STEM education resources available from NSF-supported Centers. The Centers support searchable databases and include research briefs, webinars, research and assessment tools, curriculum, exhibit and program resources, listings of upcoming conferences, and abstracts of project funded by NSF, NIH-SEPA, the Institute of Museum and Library Services and others.

Four Centers will be featured:

- Center for the Advancement of Informal Science Education (CAISE): [informal.science.org](http://informal.science.org)
- STEM Learning and Research Center (STELAR; career-focused STEM education): <http://stelar.edc.org>
- Center for Innovative Research in Cyberlearning (CIRCL): <http://circlcenter.org>
- Community for Advancing Discovery Research in Education (CADRE; PreK-12 STEM education): <http://cadrek12.org>

**Level:** Beginner

#### **Presenters:**

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

Jamie Bell, PhD, Director, Center for the Advancement of Informal Science Education

**Room:** Independence I

### **Commercializing your SEPA**

This session will bring together PIs who have successfully moved their SEPA creations to the commercial side. With likely decreases in the federal funding for science and biomedical education grants, such funding could be a great source of support, but most scientists don't know how to do it. This session will introduce you to individuals who have made the leap, and provide you an idea of how you could also make that leap.

**Level:** Intermediate

**Facilitator:** J. Michael Wyss, PhD, Professor, University of Alabama at Birmingham

#### **Presenters:**

Dina Markowitz, PhD, Professor, University of Rochester

Melissa Gilliam, MD, Professor of Ob/Gyn, University of Chicago

Andrij Holian, PhD, Professor, University of Montana

**Room:** Independence H

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THURSDAY, JUNE 1 1:30 - 2:45 PM

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### **Models for Building Relationships With Students and Communities That Support Science Learning and Success**

Four SEPA PI's will present individual organization models for building relationships with students and communities. They will describe the multiple stakeholders and how they collaborate. They will present broadly described evaluation or research strategies that provide evidence that these models support science learning and/or science workforce development. Discussion will follow with all attendees to flesh out these and additional models worthy of replication.

**Level:** All

**Panelists:**

Ann Chester, PhD, Assistant Vice President, West Virginia University  
Maurice Godfrey, PhD, Professor, University of Nebraska Medical Center  
Angie Millan, DNP/RN/FAAN, Nursing Director, National Association of Hispanic Nurses  
Kelley Withy, MD/PhD, Professor, University of Hawaii

**Room:** Farragut Square

***Discussion with Christopher Hoadley on Design-Based Research***

This session provides an opportunity for more in-depth discussion with Christopher Hoadley about the topics he presents in his keynote address.

**Level:** All

**Facilitator:** Judy Brown, EdD, Patricia & Phillip Frost Museum of Science

**Panelist:** Christopher Hoadley, PhD, Associate Professor, New York University

**Room:** Lafayette Park

***Evaluating Teacher Professional Development: Insights from Three SEPA Projects***

Teacher professional development can be challenging to evaluate for many reasons: determining causal relationships in outcomes; collecting observational data versus self-report; assessing impact on students, among numerous other challenges. In this session, panelists will describe the methodologies and instruments they use in evaluating and/or researching teacher professional development. Attendees will be encouraged to present questions or challenges they face in their own SEPA projects, many of which will be addressed during the session.

**Level:** Beginner, Intermediate

**Facilitator:** Dina Drita-Esser, PhD, Sr. Research Associate, University of Utah

**Panelists:**

Paula Cupertino, PhD, Associate Professor, University of Kansas Medical Center  
Berri Jacque, PhD, Assistant Professor, Tufts Medical School  
Karina Meiri, PhD, Professor, Tufts Medical School  
Michele Shuster, PhD, Associate Professor, New Mexico State University  
Christopher Villa, MBA/MPA, Helix Solutions

**Room:** Independence A

***Establishing a Basic Genomic Literacy Framework for K-16 Students***

The National Human Genome Research Institute (NHGRI) recently convened a Strategic Visioning Meeting for a proposed new initiative called the Genomic Literacy, Education, and Engagement (GLEE) Initiative, which aims to enhance genomic literacy commensurate with the pace of genomic advances. This initiative is proposed to target three major audiences: K-16 students and educators, the general public, and healthcare professionals. The K-16 Working Group established a need to convene a diverse group of stakeholders to define a framework for Basic Genomic Literacy that could be used to inform policy-makers and curriculum developers. Building from existing state and national science and health education standards, and prior work on genetic literacy frameworks, this Breakout Session aims to develop a working draft of the Basic Genomic Literacy Framework for the GLEE Initiative. This framework could later be used to inform curriculum changes surrounding K-16 genomics education.

**Level:** All

**Facilitators:**

Beth Tuck, MA, Genomics Education Specialist, NIH/NHGRI  
Carla Easter, PhD, Chief, Education and Community Involvement Branch, NIH/NHGRI  
Laura Bonetta, PhD, Director of Educational Media, Howard Hughes Medical Institute  
Neil Lamb, PhD, VP for Educational Outreach, HudsonAlpha Institute for Biotechnology  
Pat Miller, PhD, Retired Teacher, Poolesville High School  
Daphne Rickard, Biomedical Instructor, Irving High School  
Bryony Ruegg, PhD, Director of the Bio-Rad Explorer Program, Bio-Rad Laboratories

**Room:** Independence F/G

**Science of Learning: How do SEPA Projects Incorporate Theories of Learning Into Curriculum?**

In this session, five current SEPA project leaders will present how their projects define the science of learning, and how they have incorporated the science of and motivation for learning into curriculum developed. The project leaders will briefly introduce their curriculum materials and the theories of learning behind them, and then let attendees try out these materials for approximately 10 minutes. This “speed dating” format will highlight the diversity of the SEPA curriculum portfolio and give participants a chance to find materials or new learning theories that may be useful for their own projects.

**Level:** All

**Facilitators:**

Jennifer Ufnar, PhD, Senior Research Associate/Director, Vanderbilt University  
Kristin Bass, PhD, Senior Researcher, Rockman Et Al  
Rob Rockhold, PhD, Deputy Chief Academic Officer, University of Mississippi Medical Center

**Room:** Franklin Square/McPherson Square

**Big Data in STEM Learning**

This session will bring together PIs who have successfully created a SEPA program that incorporate Big Data. With the proliferation of data that is now available in both genetics and other areas of biomedical sciences, tomorrow’s researchers will rapidly be required to input large and complex data for their own use and use by others, and they will need knowledge and skills to effectively query the databases that they and others develop. These 3 projects demonstrate effective entrées to big data for secondary students and their teachers.

**Level:** Intermediate

**Facilitator:** Mike Wyss, PhD, Professor, University of Alabama at Birmingham

**Presenters:**

Patrice Capers, PhD, Postdoctoral Fellow and Director, University of Alabama at Birmingham  
David Miklos, MS, Executive Director, DNA Learning Center, Cold Spring Harbor Laboratories  
Chuck Wood, PhD, Professor, Wheeling Jesuit University

**Room:** Independence H

## ***Planning Competitive National Science Foundation Proposals***

NSF program officers will provide an overview of NSF's research and development funding opportunities for STEM learning projects, followed by a discussion of project planning, research, evaluation, IRB's, and other "nuts and bolts" involved in proposal development. Funding supports R&D for a wide range of STEM education projects including learning in different environments, after school, exhibits, media, cyberlearning, research and assessment, professional development, curriculum, teacher professional development, and more.

**Level:** Beginner & Intermediate

**Presenter:** Robert L. Russell, PhD, Program Director, National Science Foundation

**Room:** Independence I

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THURSDAY, JUNE 1 3:00 - 4:15 PM

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## ***STEM Relationship Pipelines: A Core Component of Long-Term Impact***

Increasing representation of minority youth in STEM professions and improving community health require significant, long-term efforts. Strong relationships at the community and individual levels, as well as ongoing financial support, are essential for success. This breakout session will feature three SEPA PIs discussing their distinct but complimentary strategies for building, maintaining, and funding community-based health/STEM education program relationships well beyond year 5: a community-based health fair, an afterschool science program for middle school youth, and a university-based summer program for high school students.

**Level:** All

**Panelists:**

Michael Kennedy, PhD, Director/Research Professor, Northwestern University

Peter Crown, PhD, Multimedia Collaboratory Producer, University of Arizona Health Sciences

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

**Room:** Independence A

## ***Bilingual Exhibitions and Community Leader Dialogues in Rural Colorado Libraries***

This session will introduce strategies used in the Discover Health/Descubre la Salud traveling library exhibition program, led by the University of Colorado. These strategies include bilingual exhibitions, community dialogues and a Spanish language media plan to invite higher participation in health science learning by underserved, underrepresented and rural audiences in Colorado.

**Level:** All

**Presenters:**

Anne Holland, MS, Community Engagement Manager, Space Science Institute

Jennifer Hellier, PhD, Director of Colorado Health Professions Development Program, University of Colorado

Robert Russell, PhD, Senior Science Education Advisor, Space Science Institute

**Room:** Farragut Square

## ***Engaging a Pipeline from SEPA to IDeA Programs***

The session will provide an opportunity for IDeA program officials and members of the IDeA and SEPA program community to discuss goals, opportunities and challenges of addressing the student to scientist career development. This session will also address the needs for an early pipeline process, success stories and barriers to be overcome, and mechanisms to overcome the barriers. The SEPA program fills an important need in creating a wide variety of novel programs for pre-kindergarten to grade (P-12 teachers and students) in underserved communities to involve them in science and real world research activities. The IDeA program is composed of INBRE and COBRE to develop scientists and help increase the competitiveness of scientists in IDeA states to contribute to the public health needs of the nation. However, there may be missed opportunities to help link the SEPA and IDeA programs in order for both programs to be even more successful in developing a diverse pipeline of future biomedical workforce.

**Level:** Intermediate

### ***Facilitators:***

Tony Ward, PhD, Professor Public Health, University of Montana  
Krishan Arora, PhD, Program Officer, NIH/NIGMS

### ***Panelists:***

Ann Chester, PhD, Assist VP for Educational Partnerships, West Virginia University  
Maurice Godfrey, PhD, Professor of Psychology, University of Nebraska Medical Center  
Marisa Pedulla, PhD, Professor of Biology, Montana Tech  
Rob Rockhold, PhD, Professor of Health Sciences, University of Mississippi Medical Center  
Michele Shuster, PhD, Associate Professor Biology, New Mexico State University  
Kelley Withy, MD, PhD, Professor Complementary and Alternative Medicine, University of Hawaii

**Room:** Independence I

## ***The Evolution of the “How We Role” Evaluation: Lessons Learned From Four Iterations of Learning Assessments***

After-school programs that offer science and math experiences to young people from low-income and diverse racial and ethnic backgrounds provide needed supplemental learning experiences and vision for science careers. The assessment of student learning is vital to communicating program value. However, the implementation of standard assessments in this context is challenging as young people are tired from their school day, are from wide-ranging developmental stages, and have little buy-in to evaluation goals. The Evaluation and Learning Research Center led four different iterations of learning assessments in this context. We will share our progression of assessment approaches and how a participatory and active assessment that reinforces program values (e.g., positive peer and mentoring relationships, and effort) improved our assessment of student growth, while offering an enriching experience during valuable program time. We will share our lessons learned, theoretical approach, and discuss how this method could be applied to other programs.

**Level:** All

### ***Presenters:***

Loran Carleton Parker, PhD, Associate Director, Purdue University  
Sandra SanMiguel, PhD, Associate Dean for Engagement, Purdue University  
Lindley McDavid, PhD, Research Associate, Purdue University  
Wilella Burgess, MS, Director of Evaluation and Research Center, Purdue University  
Adrienne Fisch, BS, Program Manager, Purdue University

**Room:** Lafayette Park

## ***A Discussion of Science Identity Formation: Methods by Which Persons Find Their Space in STEM***

In this session, SciEd 2017 attendees will explore the diversity of interventions by which students begin to conceptualize themselves as contributors to/members of a greater scientific community. Stimulated by presentations from two invited speakers and coordinated by a SEPA project leader, session attendees will consider how aspects of their Lora aid that conceptual maturation. The speakers will each describe aspects of successful interventions and attendees will be challenged to engage in small group discussions that will allow them to enunciate how their projects orient their target audience (students/teachers/members of the public) to a belief that they belong to a science community. The interactive format will offer opportunities for future collaboration among projects as well as focusing project leaders on a common objective of STEM education that aligns with Next Generation Science Standards.

**Level:** All

**Facilitator:** Rob Rockhold, PhD, Deputy Chief Academic Officer, University of Mississippi Medical Center

**Presenters:**

Namandjé N. Bumpus, PhD, Associate Professor, Johns Hopkins University School of Medicine  
Jon Deventer, BS, Director of School Engagement for DE, MD, and VA

**Room:** Independence H

## ***Connecting Current Research to the Next Generation Science Standards***

When teachers have the opportunity to learn about current biological research from research scientists, how does their learning get translated back to the classroom? In this session, biologists and educators from the Exploratorium will lead a classroom activity on the evolution of eukaryotes that demonstrates one of our approaches to integrating guest scientists into teacher professional development programs. We'll show how we design hands-on, inquiry-based activities to frame the work of collaborating researchers, and to make connections between current research and the Next Generation Science Standards for middle and high school.

**Level:** Beginner & Intermediate

**Presenters:**

Hilleary Osheroff, PhD, Staff Biologist, Exploratorium  
Kristina Yu, PhD, Director, Living Systems, Exploratorium

**Room:** Franklin Square/McPherson Square

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FRIDAY, JUNE 2 8:30 - 9:45 AM

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## ***Tried and True Evaluation Instruments***

This session compiles vetted evaluation instruments from established SEPA programs to identify instruments that are particularly effective for measuring program-level change over time. Considerations are given to validity, time to complete, readability, and audience type. Participants of all experience levels are invited to share their experiences in using these tools.

**Level:** All

**Facilitators:**

Lisa Marriott, PhD, Assistant Professor, Oregon Health & Science University  
Kristin Bass, PhD, Senior Researcher, Rochman et al

**Room:** Independence H



## ***Personal Data Trackers in STEM Education***

Using self-acquired physiologic data such as heart rate, sleep pattern, and energy balance can be a powerful tool to engage students in STEM because it is personally relevant and provides a meaningful context to understand many topics that are stressed in NGSS. We will share our early experiences with personal fitness trackers and facilitate a discussion with attendees to share best practices for the use of this rapidly evolving technology.

**Level:** All

**Presenters:**

Carla Romney, DSc, Principal Investigator, Boston University and Fordham University

Donald DeRosa, EdD, Principal Investigator, Boston University

Carl Franzblau, PhD, Principal Investigator, Boston University

Kelly Nguyen, BS, CityLab Education Coordinator, Boston University

John Craven, PhD, Co-Investigator, Fordham University

Room Farragut Square

## ***Have a BLAST with DNA Subway's Blue Line***

Participants will be introduced to the Blue Line of DNA Subway ([www.dnasubway.org](http://www.dnasubway.org)), developed by Cold Spring Harbor Laboratory's DNA Learning Center as lead of the CyVerse (formerly iPlant Collaborative, NSF #DBI-0735191) Education, Outreach, and Training component. DNA Subway makes high-level sequence analysis readily available to educators and students. Participants will be led as they visualize and edit DNA sequences, analyze sequences to identify species, align sequences, and construct phylogenetic trees. Uses in the classroom and to support student research using DNA barcoding, including streamlined sequence submission to GenBank, will be presented. The session will close with an open discussion of the Blue Line and implementation.

**Level:** All

**Presenters:**

David Micklos, MS, Executive Director, Cold Spring Harbor Laboratory's DNA Learning Center

Sharon Pepenella, PhD, Educator, Cold Spring Harbor Laboratory's DNA Learning Center

**Room:** Independence A

## ***Game-Based Learning 101: Introduction to Game Design, Formal Systems, and Rules***

In this session, participants will learn the principles of user experience (UX) design and its effects on game design. Participants will then have 60 minutes to design a new board or card game from scratch.

Essential questions this session will explore:

- What is User Experience Design?
- What is a Minimum Viable Product?
- How do we hold effective brainstorming sessions?
- How do you design a bad game?

**Level:** All

**Presenter:** Ashlyn Sparrow, MA, Entertainment Technology, University of Chicago

**Room:** Independence F/G

### ***Stories from the Field: Institutional Challenges in IHE- ISE Partnerships***

This session will identify cultural challenges that often face partnerships between informal science learning institutions and institutions of higher education and is designed to actively elicit strategies that have worked in the field. What are these cultural differences? How do you turn them into assets for the project? Existing partnerships are encouraged to attend although all SEPA projects are invited!

**Level:** All

**Facilitators:**

Judy Brown, EdD, SVP Education, Phillip & Patricia Frost Museum of Science

Robert Russell, PhD, Program Officer, Division on Research & Learning, National Science Foundation

**Room:** Lafayette Park

### ***Best Practices in Professional Development: What SEPA Grantees Have Learned from K-12 Teachers and Students***

This session will focus on teacher professional development, particularly on what SEPA awardees learn from teachers and students. Up to 5 SEPA grantees will discuss best practices that they have learned and developed in collaboration with schools, teachers and students. Presenters will discuss communication with schools and teachers, building effective partnerships, and content integration strategies. Even the best laid grant plans sometimes do not translate well in execution of professional development or classroom implementation; the session will focus on successful adaptation of SEPA programs.

**Level:** All

**Presenters:**

Charles Wray, PhD, Director, The Jackson Laboratory

Karina Meiri, PhD, Professor, Tufts University School of Medicine

Georgia Hodges, PhD, Assistant Research Scientist and MAT Coordinator, University of Georgia

Barbara Hug, PhD, Clinical Associate Professor, University of Illinois

Marissa Pedulla, PhD, Professor, Montana Tech

Mary Jo Koroly, PhD, Research Associate Professor, University of Florida

**Room:** Franklin Square/McPherson Square

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FRIDAY, JUNE 2 10:00 - 11:15 AM

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### ***Diabetes, Obesity, and Cardiovascular Disease (DOC) Working Group***

The purpose of this session is to facilitate best practice discussions with projects that maintain and interest in science education related to Diabetes, Obesity, and Cardiovascular Disease. Participants will receive an update on an short form attitude toward science tool developed with DOC input, learning about the tool used by the West Virginia SEPA program, and then engage in facilitate group discussion to address new DOC agendas.

**Level:** Intermediate

**Facilitators:**

Melani W. Duffrin, PhD, Professor, East Carolina University

Ann Chester, PhD, Assistant Vice President, West Virginia University

**Room:** Lafayette Park

## ***Monitoring the Alignment of Program Objectives to Instruments: How to be an Evaluation Auto Mechanic***

Wheel alignment is part of a car's routine maintenance. If the wheels are not parallel to each other, a car can pull to one side, making it harder to get to your destination. Likewise, alignment should be a part of your ongoing evaluation practice. Periodic review of your program objectives and related instruments ensures that you're measuring what really matters. In this session, we'll describe our experience aligning a 7-week evolution curriculum unit developed by the GSLC with assessments created by AAAS Project 2061. We will share the lessons we learned from our experience, and offer practical strategies that participants can apply to their own projects.

**Level:** All

### ***Presenters:***

Kristin Bass, PhD, Senior Researcher, Rockman et al  
Dina Drits-Esser, PhD, Senior Research Associate, University of Utah

**Room:** Independence F/G

## ***Approaches to Evaluating Authentic Research Experiences***

Evaluating authentic science research experiences for students at different stages of the STEM pipeline often requires a specialized approach. This session will explore different ways to engage in evaluation of these experiences. We will present methods to identify and explore factors that affect the effect of authentic research on persistence in STEM. We will then discuss how these factors can be used to evaluate programs. An open discussion will allow participants to share their successes and failures while developing or executing evaluation of authentic research experiences.

**Level:** Beginner and Intermediate

### ***Presenters:***

Lindsay Barone, PhD, Program Evaluator, Cold Spring Harbor Laboratory's DNA Learning Center  
Preeti Gupta, PhD, Director of Youth Learning and Research, American Museum of Natural History

**Room:** Independence A

## ***Strategies for Integrating Disciplinary Literacy into Science and Health Curriculum***

Investigators who develop science curricula often integrate reading and language arts into lessons, but may miss an opportunity to build and enhance students' understanding of how to read, write and interpret scientific texts without purposeful curriculum design. This breakout session will focus on strategies to build science lessons that simultaneously develop students' disciplinary literacy and content knowledge, by presenting examples of successful design and an opportunity for participants to share grade-level appropriate approaches from their own projects.

**Level:** All

### ***Presenters:***

Alana Newell, MEd, Instructor, Baylor College of Medicine  
Nancy Moreno, PhD, Associate Provost, Baylor College of Medicine  
Christopher Burnett, MEd, Project Manager, Baylor College of Medicine

**Room:** Franklin Square/McPherson Square

## ***Student-Produced “Question-Framed Videos” and Science Identity Formation***

To “think like a scientist” is a key part of students’ identifying with the scientific research enterprise. This includes an understanding that the domain of research is the unknown, and that asking questions out of curiosity is what researchers do. To this end, each student produces a short video, framed with beginning and ending questions, about a clinical topic, research tool or technology they’re interested in. They learn the concept of pursuing research questions through iterative script revision, and science communication by figuring out how to illustrate procedures and outcomes. This includes understanding that topics and issues can raise questions that are basic science, clinical and societal in nature. We will discuss basic video evaluation in general and our University of Arizona SEPA-specific evaluation approach.

**Level:** All

### ***Presenters:***

Peter Crown, PhD, Multimedia Collaboratory Producer, University of Arizona College of Medicine

Marlys H. Witte, MD, Professor of Surgery, University of Arizona College of Medicine

Juan Ruiz, BA, Videographer/Producer, University of Arizona College of Medicine

**Room:** Farragut Square

## ***Getting Started in STEM Games***

Interested in getting started in STEM game development but aren’t quite sure where to start? This session introduces important considerations when planning for game development, including programming and art considerations, money/time/platform constraints, and incorporating evaluation into your game. Talk with experts who have previously developed games on a budget and learn key lessons that help make your game successful.

**Level:** All

**Facilitator:** Lisa Marriott, PhD, Assistant Professor, Oregon Health & Science University

### ***Panelists:***

Georgia Hodges, PhD, Assistant Research Scientist and MAT Coordinator, University of Georgia

Brinley Kantorski EdD, Director of Education and Curriculum Development, Duquesne University

**Room:** Independence H

# POSTER PRESENTATIONS

*Posters are listed alphabetically by Institution within the following topic areas:*

- Authentic Research Experiences for Students & Teachers
- Curriculum Development
- Early STEM
- Informal Science Education
- Rural STEM
- Student Science Enrichment
- Teacher Professional Development

## AUTHENTIC RESEARCH EXPERIENCES FOR STUDENTS & TEACHERS

<b>Poster</b>	<b>Project Name/Poster Title</b>	<b>Institution</b>	<b>PI(s)/Poster Authors</b>	<b>Funder</b>
1	Barcode Long Island: Exploring Biodiversity in a Unique Urban Landscape	Cold Spring Harbor Laboratory's DNA Learning Center	David Micklos	SEPA
2	NeuroLab	Coastal Marine Biolabs Integrative Biosciences Institute	Ralph Imondi, Linda Santschi	SEPA
3	Bringing Real Experiments (REX) about Substance Abuse to High School Students	Duke University Medical Center	Dimitri V. Blondel, Lisa Linnenbrink-Garcia, Rochelle Schwartz-Bloom	SEPA, SEDAPA
4	Let's Get Healthy! (CHIDR Chatter: Translating Community Research Data for Classroom Use	Oregon Health & Science University	Lisa Marriott	SEPA
5	PBS NewsHour Health Literacy and Student Reporting Labs	PBS NewsHour	Patti Parson, Leah Clapman	SEPA
6	BioSTORM	Salish Kootenai College	Regina Sievert	SEPA
7	Western New York Genetics in Research and Health Care Partnership	State University of New York at Buffalo	Stephen Koury, Shannon Carlin-Menter	SEPA
8	Clues from Planarians on Sweeteners: Behavioral Effects of Splenda, Equal and Sucrose	Temple University	Scott Manning Rawls	SEPA, SEDAPA

9	Anxiety in Planarians: Effects of Predator Odor and Prozac	Temple University	Scott Manning Rawls	SEPA, SEDAPA
10	The PARE Project: Introducing a Sustainable Course-Based Research Program to Diverse Classroom Settings	Tufts University School of Medicine	Elizabeth Genné-Bacon, Carol Bascom-Slack	NSF
11	San Francisco Health Investigators	University of California – San Francisco	Rebecca Smith, Katherine Nielsen	SEPA
12	Enhancing Student Trainees' Research, Communication, and Leadership Skills: Mentoring Crystallization and Crystallography Interventions	University of Puerto Rico	Jose Rodriguez-Medina, Juan Lopez-Garriga	NIAID, IDeA Networks of Biomedical Research Excellence
13	Empowering Pre-service Teachers and Students With Environmental Health Research	University of Wisconsin-Milwaukee	Dave Petering, Craig Berg	SEPA
14	Day of Discovery: A STEM Pipeline Program for Middle School Students	Vanderbilt University	Virginia Shepherd, Jennifer Ufnar	SEPA
15	Teaching to Learn: WV-HSTA Students Take CBPR to Their Communities	West Virginia University	Ann Chester	SEPA

### CURRICULUM DEVELOPMENT

<b>Poster</b>	<b>Project Name/ Poster Title</b>	<b>Institution</b>	<b>PI(s)/Poster Authors</b>	<b>Funder</b>
16	STEM Foundations: Science Inquiry and Literacy	Baylor College of Medicine	Nancy P. Moreno	SEPA, Blueprint for Neuroscience, NIAID
17	CityLab and Urban Squash: A New Pathway to Achieve STEM Success	Boston University, Fordham University	Carl Franzblau, Donald DeRosa, Carla Romney, John Craven, Kelly Nguyen	SEPA
18	Developing Skills in Health Literacy	BSCS	Anne Westbrook	SEPA

19	Sharing ASSETs: Expanding Science Opportunities in K – 12 Classrooms	Cornell University	Theodore Clark	SEPA
20	The Partnership in Neuroscience Education	Duquesne University	John A. Pollock	SEPA
21	Young Scientists, Ambitious Teachers Improving Health in an Urban Ecosystem	Iowa State University	Katherine Richardson Bruna, Gale Seiler, Lyric Bartholomay	SEPA
22	Fighting with Food	Miami University	Susan Hershberger	SEPA
23	A New Genomic Framework for Schools and Communities	Michigan State University	Joseph Krajcik, Toby Citrin	SEPA
24	Neuroscience in Your World: A Partnership for Neuroscience Education Across the K-12 Spectrum	The Franklin Institute Science Museum	Jayatri Das	Blueprint for Neuroscience
25	SYSTEMS (Stimulating Young Scientists to Engage, Motivate, and Synthesize)	University of Georgia	Georgia Hodges	SEPA
26	PAGES	University of Illinois	Barbara Hug, Becky Fuller, Brian Reiser	SEPA
27	High School Research Initiative	University of Texas at Austin	Gwendolyn M. Stovall	SEPA
28	Genes and Microbes: Engaging Students and Teachers in NGSS-Aligned Curricula and Professional Development	University of Utah	Louisa A. Stark	SEPA

#### EARLY STEM

<b>Poster</b>	<b>Project Name/ Poster Title</b>	<b>Institution</b>	<b>PI(s)/Poster Authors</b>	<b>Funder</b>
29	Partnerships to Promote Healthy Lifestyles for Children and Communities	Mississippi State University	Julie Parker	SEPA
30	This Is How We "Role": Inspiring Future Researchers through Veterinary Medicine	Purdue University	Sandra San Miguel, L. Carleton Parker, W. Burgess, K. Cipriani	SEPA

## INFORMAL SCIENCE EDUCATION

<b>Poster</b>	<b>Project Name/ Poster Title</b>	<b>Institution</b>	<b>PI(s)/Poster Authors</b>	<b>Funder</b>
31	Human Health, Biodiversity, and Microbial Ecology: Strategies to Educate	American Museum of Natural History	Preeti Gupta, Rob DeSalle	SEPA
32	San Gabriel Valley SEPA Collaborative	City of Hope Beckman Research Institute	Christopher Sistrunk	SEPA
33	More Than Just a Taste of Citizen Science	Denver Museum of Nature & Science	Nicole Garneau	SEPA
34	Duke Med Activated – BOOST	Duke University School of Medicine	Brenda Armstrong	SEPA
35	Citizen Science HD	Emory University	Adam Marcus, Theresa Gillespie	SEPA
36	DNA Runs in the Family	Georgia State University	Barbara Baumstark	SEPA
37	MedLab: Using Patient Simulation for Student Exploration of Community Health Issues	Museum of Science and Industry, Chicago	Rabiah Mayas, Patricia Ward	SEPA
38	Hispanic Role Models in Health Careers	National Association of Hispanic Nurses	Angie Millan	SEPA
39	Transmissions: Astonishing Tales of Animal-Human Diseases	New York Hall of Science	Martin Weiss	SEPA
40	Weighing the Evidence	Science Museum of Minnesota	Laurie Fink	SEPA
41	Discover Health	University of Colorado Anschutz Medical Campus	Jennifer L. Hellier	SEPA
42	Get in the GROOVE	University of Miami	Patrice G. Saab, Judy A. Brown	SEPA
43	Biology of Human	University of Nebraska	Judy Diamond, Julia McQuillan, Charles Wood	SEPA
44	Resources for Education & Action for Community Health in Ambler (REACH Ambler)	University of Pennsylvania, Perelman School of Medicine; Chemical Heritage Foundation	Frances K. Barg, Edward Emmett, Jody Roberts	SEPA



## RURAL STEM

<i>Poster</i>	<i>Project Name/ Poster Title</i>	<i>Institution</i>	<i>PI(s)/Poster Authors</i>	<i>Funder</i>
45	The MENTORS Project	Texas A&M Health Science Center	Robin Fuchs-Young	SEPA
46	Training Rural/Underserved Youth to Understand & Pursue Scientific Careers	University of Montana	Andrij Holian, Tony Ward	SEPA
47	Accelerating Access: Health Science Education in Native American Communities	University of Nebraska Medical Center	Maurice Godfrey	SEPA
48	PIPES: Possibilities in Post-secondary Education and Science	University of Tennessee	Melinda Gibbons, Erin Hardin	SEPA

## STUDENT SCIENCE ENRICHMENT

<i>Poster</i>	<i>Project Name/ Poster Title</i>	<i>Institution</i>	<i>PI(s)/Poster Authors</i>	<i>Funder</i>
49	Enhancing Secondary School STEM Education For Students and Teachers Through Biomedical Engineering Design	Columbia University	Aaron M. Kyle	SEPA
50	Seeing the Science of Drug Addiction: Conducting Independent Research with a Student Who Is Visually Impaired	East Carolina University	Rhea Miles	SEDAPA
51	The Importance of Improving Underserved and Underrepresented Minority Youths' Attitudes Toward Science: Validation of a Short Form Attitudes Toward Science Survey	East Carolina University	Melani Duffrin	SEPA
52	Engaging Families to Enhance Science Learning and Interest in STEM Careers	Seattle Children's Research Institute	Amanda L. Jones	SEPA
53	Translating Translation and Scientific Questioning in the Global K-12 Community	University of Arizona College of Medicine	Marlys H. Witte, Francisco Garcia	SEPA
55	HiSCI	University of Hawaii	Kelley Withy	SEPA

55	Medicines and Me: Understanding and Using Medicines Safely	University of Rochester	Dina Markowitz	SEPA
56	In-Classroom Biology Internships for Students and Teachers in Underserved Schools	Walter Reed Army Institute of Research	Debra L. Yourick	SEPA
57	Pandem-Sim: Saving Earth with Biology	Wheeling Jesuit University	Charles Wood	SEPA

### TEACHER PROFESSIONAL DEVELOPMENT

<b>Poster</b>	<b>Project Name/ Poster Title</b>	<b>Institution</b>	<b>PI(s)/Poster Authors</b>	<b>Funder</b>
58	Frontiers in Physiology: Building Communities of Practice	American Physiological Society	Marsha Lakes Matyas	SEPA
59	The Exploratorium Digital Teaching Box Project	Exploratorium	Julie Yu, Hilleary Osheroff, Kristina Yu	SEPA
60	Building Awareness, Respect, and Confidence through Genetics (ARC)	Harvard Medical School, Sanford Research	Marnie Gelbart, Ting Wu, Elizabeth McMillan	SEPA
61	Turning K-12 Environmental STEM Education InSciEd Out	Mayo Clinic, University of Minnesota	Chris Pierret, James Cotner	SEPA
62	Teachers FIRST	Milwaukee School of Engineering	Tim Herman	SEPA
63	Bringing Research Into the Classroom (BRIC)	Montana Tech	Marissa L. Pedulla	SEPA
64	Science Tools in the Classroom	New Mexico State University	Michele Shuster	SEPA
65	Science Club Summer Camp: Training Teachers and Youth in Authentic STEM Practice	Northwestern University	Michael Kennedy	SEPA
66	BEST Science! Bioscience Enrichment for Students and Teachers	Ochsner Medical Center- New Orleans; Louisiana State University Health Sciences Center	Jawed Alam, Paula Gregory	SEPA
67	Teaching the Genome Generation	The Jackson Laboratory	Charles Wray, Gareth Howell	SEPA

68	Modeling for Fidelity: Mentored Dissemination of a Novel Infectious Disease Curriculum	Tufts Medical School	Berri Jacque, Karina Meiri	NIAID
69	The Great Diseases: Biomedical Science in the High School Classroom	Tufts Medical School	Karina Meiri, Berri Jacque	SEPA
70	Science Education Enabling Careers (SEEC)	University of Alabama at Birmingham	J. Michael Wyss	SEPA
71	Biomedical Explorations: Bench to Bedside	University of Florida	Mary Jo Koroly	SEPA
72	T-SCORE: Teachers & Students for Community Oriented Research & Education	University of Kansas Medical Center	Paula Cupertino	SEPA
73	STEMI: Growing a Community for Teacher Innovation in STEM	University of Mississippi Medical Center	Rob Rockhold	SEPA
74	Identifying, Assessing, and Visualizing Competencies for Teaching Science in a Flipped Learning Environment – The STEMI Competency Model	University of Mississippi Medical Center	M. Barnard, C. Copretta, E. Dehon, A. Notebaert, T. Pollard, D. Sullivan, E. Meyer, J. Taylor, S. Stray, R. Rockhold	SEPA
75	Empowering K-12 Teachers Through a Bioscience Academy	UT Health Science Center at San Antonio	Michael Lichtenstein	SEPA

# POSTER ABSTRACTS

## AUTHENTIC RESEARCH EXPERIENCES FOR STUDENTS & TEACHERS

### 1. **Barcode Long Island: Exploring Biodiversity in a Unique Urban Landscape**

*Cold Spring Harbor Laboratory's DNA Learning Center, David Micklos*

Barcode Long Island (BLI) enables authentic high school student research using DNA barcoding to explore, document, and track biodiversity on Long Island, New York. The project supports all aspects of student research through teacher training in the use of the DNA Learning Center's biochemical, bioinformatics, and geospatial tools, supply of equipment and reagents, and a dedicated website. A BD2K supplement expands BLI to include microbiome research, introducing computer science and next generation sequencing analysis. Project progress, student results, and ongoing evaluation of student and teacher effects will be presented.

### 2. **NeuroLab**

*Coastal Marine Biolabs Integrative Biosciences Institute, Ralph Imondi, Linda Santschi*

NeuroLab establishes a unique model for biomedical citizen science. The project's educational strand includes residential research institutes that engage upper-level HS students in deep explorations of developmental neuroscience and the scientific model-building enterprise. These experiences provide unique opportunities for students to generate data and identify new tools to visualize/manipulate neurons during embryogenesis. The project's scientific strand creates new web-based technologies for students to organize, analyze, validate, annotate, and share professional-quality molecular genetic and neuronal expression data with the neuroscience community. The project also involves the development of instructional resources, including a neuroscience-centered game space, that are aimed at extending program reach into traditional HS learning settings.

### 3. **Bringing Real Experiments (REX) about Substance Abuse to High School Students**

*Duke University Medical Center, Dimitri V. Blondel, Lisa Linnenbrink-Garcia, Rochelle Schwartz-Bloom*

High school science laboratories have historically faced obstacles including limited funds, "boring" topics, and cookbook-style approaches. Thus, we developed Rex, a web-based platform allowing students to "conduct" virtual experiments online, interact with real scientists and use real data generated from published studies. Students can choose from seven neuroscience and behavior experiments. By using this active-learning interface and including topics relevant to teenagers, we seek to increase student interest and engagement in science. We implemented Rex in 11 high school biology classrooms using a pre-post counterbalanced design to test its effectiveness, measuring situational and individual interest, and critical thinking skills.

### 4. **Let's Get Healthy! (CHIDR Chatter: Translating Community Research Data for Classroom Use**

*Oregon Health & Science University, Lisa Marriott*

Let's Get Healthy! is an education and research exhibit that conducts health assessments of school districts and communities. It provides immediate e-feedback to participants based on their health results. The population-level data are returned to the organizations for grant applications, needs assessments, and student projects. This poster describes student research experiences, interprofessional workforce training, and lessons learned when engaging schools in the use of research data.

## **5. *PBS NewsHour Health Literacy and Student Reporting Labs***

*PBS NewsHour, Patti Parson, Leah Clapman*

PBS NewsHour Health Literacy aims to: 1) provide critical health information to the public; 2) train the next generation of health science communicators, and 3) promote interest in health and biomedical careers. Through this project, we are developing relevant and timely health science stories for PBS NewsHour's broadcast and digital audiences and training youth to produce health science video reports from their perspective through the PBS NewsHour Student Reporting Lab program. We describe Year 1 evaluation findings, which have identified health topics of interest to the American public and youth and generated feedback on health science broadcast stories.

## **6. *BioSTORM***

*Salish Kootenai College, Regina Sievert*

In an effort to increase the number of American Indian high school students who are prepared for college academic majors in the biomedical and biobehavioral fields, Salish Kootenai College (SKC) has developed BioSTORM, a dual enrollment STEM Academy. The Academy has three major components: 1. academic coursework that is rigorous, transferrable as college credit, and provides model STEM education; 2. authentic biomedical and biobehavioral research; and 3. an outreach component through which BioSTORM students will present their research to elementary and middle school students. Participants will experience a culturally relevant learning environment that enhances students' educational outcomes, including college readiness.

## **7. *Western New York Genetics in Research and Health Care Partnership***

*State University of New York at Buffalo, Stephen Koury, Shannon Carlin-Menter*

The Western New York Genetics in Research and Health Care Partnership was designed to locally help improve what is recognized nationally as a lack of public knowledge about bioinformatics/ genomics. Faculty from the University at Buffalo and staff with New York's Area Health Education Centers (AHEC) recruit teachers within the Erie Niagara and WNY Rural regions. Teachers are then trained to use the GENI-ACT toolkit (Genomics Education National Initiative – Annotation Collaboration Toolkit). Teachers and grant staff hold multiple recruitment activities to attract students' interest within the field of genetics and bioinformatics. Teachers work with a pool of students to complete genome annotation activities using nine GENI-ACT modules. The hands-on experience provides opportunities for students to find, understand, and critically evaluate other's research, as well as to learn how to access databases of information. We are currently completing Year 2 of the SEPA Grant.

## **8. *Clues from Planarians on Sweeteners: Behavioral Effects of Splenda, Equal and Sucrose***

*Temple University, Scott Manning Rawls*

Sweetened diets share commonalities with drugs of abuse, but studies comparing behavioral effects of different sweeteners are lacking. We used a tetrad of behavioral assays in planarians to compare common table sugar with Splenda and Equal. Each sweetener produced stereotyped responses and reduced motility. In experiments testing for anxiogenic-like effects, planarians withdrawn from Splenda (1, 3%) or sucrose (1, 3%) spent more time in a dark environment. In place conditioning experiments, both Splenda (0.01%) and sucrose (0.01%) produced an environmental preference shift. Our data reveal that Splenda produces sucrose-like rewarding and withdrawal effects in planarians.

## **9. Anxiety in Planarians: Effects of Predator Odor and Prozac**

*Tufts University – School of Medicine, Schott Manning Rawls*

Planarians were given fluoxetine and stepholidine (SPD) to counteract anxiety in the face of danger. Fluoxetine (Prozac) is an approved medication for depression and anxiety. SPD is a natural extract that may display anxiolytic activity. By nature, planarians prefer the dark versus light. Planarians treated with SPD or fluoxetine spent a greater amount of time in the light. Planarians exposed to predator odor spent a more time in the dark, which is indicative of heightened anxiety, but the effect was partially counteracted by fluoxetine. Collectively, these data suggest approved medications and naturally occurring extracts display anxiolytic activity in planarians.

## **10. The PARE Project: Introducing a Sustainable Course-Based Research Program to Diverse Classroom Settings**

*Tufts University – School of Medicine, Elizabeth Genné-Bacon, Carol Bascom-Slack*

Studies have demonstrated the positive impact of early research experiences on retention of students in STEM fields, but these experiences are not easily accessible to all students. The Prevalence of Antibiotic Resistance in the Environment (PARE) project addresses this issue by making authentic research easy to integrate into diverse types of lab-based courses. PARE is a short-duration, low cost, course-based research module that gives students a taste of real research by collecting key data for a national research effort studying antibiotic resistance in soil. Attitudinal survey data shows the PARE project experience helps students make gains in several key areas.

## **11. San Francisco Health Investigators**

*University of California – San Francisco, Rebecca Smith, Katherine Nielsen*

San Francisco Health Investigators (SFHI) engages 20 high school students annually in a year-long research project to investigate their community's knowledge and awareness about a health topic. Students use their research to inform the design targeted health messages, then study the effectiveness of these messages. The 2016 theme for SFHI was infectious diseases and immunity – and students' messages focused on 1) Zika virus, 2) Pertussis, 3) vaccination, and 4) mosquito-borne illnesses. The poster will present the students' research and messaging work, as well as tools in development to assess change in student's researcher identity through their participation in this project.

## **12. Enhancing Student Trainees' Research, Communication, and Leadership Skills: Mentoring Crystallization and Crystallography Interventions**

*University of Puerto Rico, Jose Rodriguez-Medina, Juan Lopez-Garriga*

Graduate students mentor, through a crystallization competition, 23 teachers and 144 students from sixteen schools, how to research the unique conditions that lead to the formation of single crystals of lysozyme and myoglobin. The results show that mentors enhance significantly their knowledge, experimental design, independent research, communication, and leadership skills. Simultaneously, the interaction was very effective helping teachers and their students to understand the crystallization concepts and the equilibrium between solution and precipitate. Furthermore, using protein crystallization sparks discussion about chemical structure and function in precollege increasing the number of students that become interest to pursue college studies in bio-STEM.

### **13. Empowering Pre-service Teachers and Students With Environmental Health Research**

*University of Wisconsin-Milwaukee, Dave Petering, Craig Berg*

The goal of the UW-Milwaukee SEPA program is to prepare pre-service teachers to introduce inquiry/research into their teaching that connects concepts in life science to related issues in environmental health and thereby addressing the NGSS standards. The significance of this program is that it combines pre-service teacher professional development with student activities that involve in-depth authentic experimentation. The SEPA poster describes each of the modules, as well as various components of the program such as current science standards that drive the program, the in-depth pre-service teacher training, various student learning opportunities (e.g., research activities, Student Research Conference), and program evaluation.

### **14. Day of Discovery: A STEM Pipeline Program for Middle School Students**

*Vanderbilt University, Virginia Shepherd, Jennifer Ufnar*

The overall goal of the Vanderbilt Day of Discovery (DoD) is to design and implement a “pull-out” program for middle school students that will provide authentic STEM learning experiences. The DoD brings students from five middle schools to two sites to spend 3-4 hours per week working on advanced STEM projects. This first year was considered a start-up year, with field testing the curriculum, solving logistical issues such as busing, developing co-teaching partnerships, and creating evaluation instruments. The evaluation study includes pre-/post-attitude surveys for students, classroom observations, and longitudinal studies tracking participants through high school.

### **15. Teaching to Learn: WV-HSTA Students Take CBPR to Their Communities**

*West Virginia University, Ann Chester*

The Health Sciences & Technology Academy (HSTA) at West Virginia University is an after school program in West Virginia for underrepresented students in grades nine through twelve. The program provides students with authentic opportunities to perform community based research and to partner with scientists and researchers. Rising juniors attend a campus Biomedical Summer Institute to prepare to conduct research in their communities addressing health issues associated with Metabolic Syndrome. The “My First Patient” project is one of many examples to be discussed.

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## **CURRICULUM DEVELOPMENT**

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### **16. STEM Foundations: Science Inquiry and Literacy**

*Baylor College of Medicine, Nancy P. Moreno*

Scientists and educators at Baylor College of Medicine are developing, and disseminating new teaching resources that integrate science and health content, scientific practices and cross-cutting concepts (such as patterns, cause and effect, and structure and function) with reading/language arts for the elementary grades. All resources are field-tested using a rigorous comparison group design with random assignment of groups to treatments. Each unit is revised after field-testing and made available with supporting resources on the website, BioEd Online ([www.bioedonline.org](http://www.bioedonline.org)).

### **17. CityLab and Urban Squash: A New Pathway to Achieve STEM Success**

*Boston University, Fordham University, Carl Franzblau, Donald DeRosa, Carla Romney, John Craven, Kelly Nguyen*

In Year 1 of our SEPA project, we are developing an exercise physiology curriculum supplement for use in

urban squash education programs that capitalizes on the appeal, relevance, and utility of personal data trackers. We will describe our draft unit and preliminary results from the initial pilot study.

### **18. *Developing Skills in Health Literacy***

*BSCS, Anne Westbrook*

We are all exposed to a wide variety of health information each day through various forms of media. Some of this information is accurate, some is inaccurate, and sometimes it is difficult to figure out what to believe. Developing Skills in Health Literacy is developing curriculum modules to help students learn how to make better decisions about health-related information using evidence. The modules are currently being pilot tested to determine their effectiveness with students. In this poster, we will present updates about the lessons and the results from both teachers and students who participated in the pilot test.

### **19. *Sharing ASSETs: Expanding Science Opportunities in K – 12 Classrooms***

*Cornell University, Theodore Clark*

“Sharing ASSETs: Expanding Science Opportunities in K-12 Classrooms” is developing hands-on K-12 science curricula featuring live Tetrahymena, a safe, easy to grow protozoan with structural and functional complexity comparable to metazoan cells. ASSET modules actively engage students in an inquiry driven investigation of a variety of key biological concepts. Cross-curricular materials placing science and scientific research within a broad social context are also being developed, as are new options for supporting high school students wishing to pursue independent classroom research. ASSET curricula provide clear well-tested protocols, and access to an equipment lending library to facilitate implementation in low-resource schools.

### **20. *The Partnership in Neuroscience Education***

*Duquesne University, John A. Pollock*

The “Partnership in Neuroscience Education” creates narrative driven multimedia resources on issues related to modern neuroscience research and health literacy. Our current project, Bibliotech, is an app that supports interactive stories about the fundamental workings of the nervous system. “BiblioTech: Cityhacks: In Search of Sleep” is currently available for iPad. Existing complementary resources are available at <http://thepartnershipineducation.com>. While complex health and science topics are studied in middle school, we have found that younger students are very capable of understanding and appreciating the underlying fundamental principles when presented in a manner that is both accessible and meaningful to the child. We believe that building a strong understanding of neuroscience early in life will dramatically enhance the learning that can be achieved in subsequent years.

### **21. *Young Scientists, Ambitious Teachers Improving Health in an Urban Ecosystem***

*Iowa State University, Katherine Richardson Bruna, Gale Seiler, Lyric Bartholomay*

Mosquitoes & Me is a two-week summer camp engaging early middle-grades students with authentic community-based mosquito discovery activity. It equips historically-underserved youth with knowledge and skills related to mosquito biology, ecology, and epidemiology that enables them to act as public health messengers in their own families and neighborhoods. This poster describes the Mosquitoes & Me curriculum and its foundation in the principles and practices of ambitious science teaching. Youth play an important role in educating adults living in neighborhoods that have been under-surveyed by traditional mosquito research about factors contributing to mosquito populations, many of which reflect broader socio-economic disparities.



## **22. Fighting with Food**

*Miami University, Susan Hershberger*

Fighting with Foods (FWF) is a collaboration among science educators and environmental health researchers. FWF develops and tests curriculum materials that integrate the role of foods in combating the effects of toxicants with core physical and biological science standards on matter. In project years 1–3, barriers were perceived in teachers' ability to incorporate NGSS Science and Engineering Practices into FWF lessons, and measures of student learning showed minimal gains. In year four of the project, a FWF Inquiry Cycle lesson structure was introduced. Fidelity to inquiry teaching practices improved, and measures of student learning showed much stronger gains.

## **23. A New Genomic Framework for Schools and Communities**

*Michigan State University, Joseph Krajcik, Toby Citrin*

In "What controls my health?", middle school students build a model of Type-2 diabetes to understand how genes and environment interact to affect their health. This classroom learning becomes a starting point for community action research projects. The class is transformed into a research group to examine a health issue in the nearby environment that can be changed to improve the community's health. In the final step, students present results of their projects back to families and broader community with recommendations for program and policy change. The curriculum is being field tested in 6th grade classrooms in two urban communities.

## **24. Neuroscience in Your World: A Partnership for Neuroscience Education Across the K-12 Spectrum**

*The Franklin Institute Science Museum, Jayatri Das*

In support of the Your Brain exhibit at The Franklin Institute, two sets of curricula have been developed to encourage high school students to understand and apply neuroscience to their lives. "Understanding the Teen Brain" is an 8-module mini-course developed for 9th & 10th grade students to better understand how their brains develop, learn, and are affected by drug use during teen years. "Neuroscience and Society" is a semester-long elective course developed for 11th & 12th grade students to offer an in-depth focus on neuroscience through the lens of societal issues relevant to older teenagers.

## **25. SYSTEMS (Stimulating Young Scientists to Engage, Motivate, and Synthesize)**

*University of Georgia, Georgia Hodges*

The purpose of the SYSTEMS project is to create an immersive learning experience for elementary learners in which learners engage in use of the scientific practices while learning fundamental biological concepts related to obesity. We will present findings from two studies conducted with elementary students (n=64) who played the SYSTEMS game and participated in the accompanying curriculum. We will share how we conducted the iterative research design as well as lessons we have learned regarding working in elementary schools with students and teachers.

## **26. PAGES**

*University of Illinois, Barbara Hug, Becky Fuller, Brian Reiser*

PAGES (Progressing through the Ages: Global change, Evolution, and Societal well-being) is an ambitious Next Generation Science Standards (NGSS)-aligned curriculum development and K–12 teacher education program. Our approach to curriculum development and teacher education is based on current science education research findings for improving teacher skills and student learning. Core components of our approach include: Tackle important science ideas; Support teachers; Connect content learning to rele-

vant social topics; Develop a progression of learning across K-12 grades; Integrate all aspects of science learning. In this poster, we report on early efforts of our project.

### **27. High School Research Initiative**

*University of Texas at Austin, Gwendolyn M. Stovall*

The High school Research Initiative (HRI) offers a dual-enrollment course in science research, offering high school science credit, as well as The University of Texas course credit. Taught at high school campuses, this unique course combines open inquiry research for the first semester and University-partnered research collaborations for the second semester.

The NIH SEPA-funded HRI program is the result of partnerships between nationally recognized UT-Austin programs: UTeach, FRI, and OnRamps. UTeach specializes in STEM teacher preparation, while the FRI specializes in undergraduate research experiences and OnRamps offers infrastructure and experience in hosting dual-enrollment courses throughout Texas.

### **28. Genes and Microbes: Engaging Students and Teachers in NGSS-Aligned Curricula and Professional Development**

*University of Utah, Louisa Stark*

This project is developing two NGSS-aligned curriculum units. The middle school unit addresses the disciplinary core ideas about Structure and Function, the science practices of modeling and engaging in argument from evidence, and the crosscutting concepts of scale, and structure and function. The high school unit addresses the disciplinary core ideas about Heredity: Inheritance and Variation of Traits, the science practices of modeling and data analysis/interpretation, and the crosscutting concepts of cause and effect. The efficacy of the units for student learning will be studied using a RCT design. Online courses and in-person workshops will prepare teachers to implement the units with their students.

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## EARLY STEM

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### **29. Partnerships to Promote Healthy Lifestyles for Children and Communities**

*Mississippi State University, Julie Parker*

This poster session will provide an overview of The WannaBee Healthy program and early childhood teachers' perceptions of using an integrated health science curriculum with children ages 4 to 6 years. Results suggest that the teachers implemented the curriculum in all of the areas; however, fewer curriculum activities from the science domain were implemented. Science education in early childhood is an important curriculum domain and when provided within the context of developmentally appropriate activities can positively impact brain development and promote a curiosity for learning. Future research should investigate why the science domain received less attention than the other areas.

### **30. This Is How We "Role": Inspiring Future Researchers through Veterinary Medicine**

*Purdue University, Sandra San Miguel, L. Carleton Parker, W. Burgess, K. Cipriani*

The program goal is to diversify the veterinarian-scientist workforce by providing STEM experiences and role models for educationally disadvantaged K-4 students. The program will focus on curriculum development and training of veterinary medical students and veterinarian-scientists to be role models and deliver the program, followed by nationwide distribution to U.S. colleges of veterinary medicine. Informational books and an online certificate program will promote health science literacy and encourage careers in biomedical and clinical research. Assessment will examine whether the approaches and curriculum are effective across the diverse communities and geographic regions that span our country.

### **31. Human Health, Biodiversity, and Microbial Ecology: Strategies to Educate**

*American Museum of Natural History, Preeti Gupta, Rob DeSalle*

This project aims to educate both the general public and teacher and student audiences about the critical links between human health and biodiversity. The programs used to achieve the goals are 1) onsite informal series of SciCafes for adult audiences, for youth and for educators and 2) A series of exhibition elements including an app tour of AMNH through the lens of biodiversity and human health and 3) a polling station to gather current state of understanding. We will review findings related to motivations to attend, and participant gains and discuss plans and related challenges for studying long-term impact.

### **32. San Gabriel Valley SEPA Collaborative**

*City of Hope Beckman Research Institute, Christopher Sistrunk*

The San Gabriel Valley SEPA Collaborative has three aims: 1) establish a two-stage research education program for rising high school juniors and seniors; 2) establish a professional development program for K-12 teachers; 3) establish a K-8 research education program. We will present updates pertaining to aims 1 and 3, outlining the new high school summer research program, and updates to the 5th grade curriculum. In addition, we will describe how the current program has led to an increase in community interest and asks, an increase in participation among City of Hope scientists, and to the development of additional outreach programs.

### **33. More Than Just a Taste of Citizen Science**

*Denver Museum of Nature & Science, Nicole Garneau*

The Genetics of Taste Lab is a community-based lab that has two methods of participating in crowd-sourced science. First, museum guests can participate by contributing their own data as human subjects. Second, people can train as citizen scientists, including NIH ethics, data collection, data analysis and dissemination. We have convened a community advisory board to recommend ways to reach out to under-represented communities and break down barriers to participation. Using a combination of evaluation and learning research we are studying how design considerations and level of involvement by citizen scientists affects diversity, research integrity, citizen scientist understanding and guest experience.

### **34. Duke Med Activated – BOOST**

*Duke University School of Medicine, Brenda Armstrong*

What is the power of hands on, out of class learning? At BOOST we utilize the world as learning space. The potential merits of field trips are limitless. Take the young man who has a record of suspensions in school, is a leader among his peers but is totally disengaged in the school classroom setting. Now take the same young man, transport him to the wild outside. Put a purpose and a net in his hand and point him towards nature. The results have been astounding! The immaturity, vanity and lack of focus melt away. The child is transformed, in front of our eyes into a budding scientist. No lesson plan, standardized testing or common core curriculum could inspire the way the world does.

### **35. Citizen Science HD**

*Emory University, Adam Marcus, Theresa Gillespie*

The Citizen Science HD program is in it's first year of funding and has launched our first pilot program focused on pH and water quality, developed a website to disseminate information, and collaborated with the Atlanta Science Festival on an interact exhibit. Future work of the program includes creating curricular units for classrooms and implementing an after school STEM program for Title I middle schools.

### **36. DNA Runs in the Family**

*Georgia State University, Barbara Baumstark*

As the instructional manual for all living things, DNA plays a pivotal role in STEM education. Moreover, recent advances in our understanding of DNA, coupled with their application to issues of both theoretical and practical importance, make it imperative that the achievement of scientific literacy include a genetic and DNA-based component. Using the relatively structured setting of the classroom, we previously developed entertaining and informative DNA learning modules optimized for specific age groups. Now, in partnership with informal science venues such as libraries and community organizations, we are sharing these activities with children, their parents, and other family members.

### **37. MedLab: Using Patient Simulation for Student Exploration of Community Health Issues**

*Museum of Science and Industry, Chicago, Rabiah Mayas, Patricia Ward*

The MedLab program engages middle- and high-school students in health sciences through medical simulations and uses both virtual and physical environments to highlight community health issues.

### **38. Hispanic Role Models in Health Careers**

*National Association of Hispanic Nurses, Angie Millan*

In the United States there are approximately 3 million registered nurses and represent the largest segment of the US health care workforce. The need for culturally competent, bilingual health care providers is increasing, yet the workforce is not as diverse as it needs to be in order to provide culturally relevant care to all populations. Yet, Hispanics only represent 3.6% of all nurses. The National Association of Hispanic Nurses aim is to increase the number of Hispanic nurses by using traditional Spanish-language mass media to reach out to young Hispanic youth and inspire them to seek a career in nursing.

### **39. Transmissions: Astonishing Tales of Animal-Human Diseases**

*New York Hall of Science, Martin Weiss*

New York Hall of Science is developing a graphic novel to focus on the diseases that humans and animals share and pass between them (often with many deaths), from Ebola, bird flu, and West Nile disease to influenza, measles, and pneumonia. Moreover, like many other contemporary graphic novels, it will address a pressing issue of the day – namely, the growth of zoonotic and anthrozoönotic diseases. The graphic novel will be developed in a digital, interactive format (a growing trend within the genre) and, like many graphic novel titles, will take a mystery and forensic crime approach to exploring its content.

### **40. Weighing the Evidence**

*Science Museum of Minnesota, Laurie Fink*

Health care is expensive and complex, and there are many competing interests requiring all of us—consumers, policy makers, and civic-leaders—to make more challenging decisions and take an active role in advocating for our constituents and ourselves. Making effective health care choices requires the science literacy and critical thinking skills necessary to understand and evaluate the evidence and options. This project brought together experts who are healthcare practitioners, researchers, health journalists, and community partners to improve the public's critical analysis skills and ability to review evidence so that they can make informed health care decisions. To meet this goal we developed an exhibition; an actor-led presentation; a web component with content and experiences from the exhibition; and a teen led outreach program. The exhibition benefits from a collection of questionable medical devices to engage museum visitors in becoming more competent health care consumers.

#### **41. Discover Health**

*University of Colorado Anschutz Medical Campus, Jennifer L. Hellier*

The University of Colorado's Area Health Education Centers (AHEC) Program Office, in collaboration with the STAR Library Education Network (STAR\_Net), and CLACE present Discover Health/Descubre la Salud, a project funded by NIH-SEPA. This traveling exhibition addresses the nation's most serious public health issues (diabetes, obesity, and cardiovascular health), especially among underserved and rural populations. It also encourages youth, especially those from at-risk communities to pursue careers in health care professions. The project engages students, families, and adults by using a strategic combination of interactive exhibits and activities in both English and Spanish presented at public libraries, community health festivals, and career events.

#### **42. Get in the GROOVE**

*University of Miami, Patrice G. Saab, Judy A. Brown*

The overall goal of Get in the GROOVE is to address health disparities impacting middle school girls by examining the effectiveness of virtual world environments, social interaction and personalized content to motivate interest in the health sciences and enhance conceptual understanding of the importance of nutrition and physical activity to overall health. Girls were randomized to 3-week summer science enrichment programs that differed in the use of virtual world technology to reinforce learning. Summer programs were held at the New York Hall of Science and Patricia and Philip Frost Museum of Science. Program outcomes include changes in health knowledge, self-efficacy, and behavior.

#### **43. Biology of Human**

*University of Nebraska, Judy Diamond, Julia McQuillan, Charles Wood*

Explore our dynamic outreach deliverables, informal education programs, and science identity research. Preview our newest comic on measles: Carnival of Contagion.

#### **44. Resources for Education & Action for Community Health in Ambler (REACH Ambler)**

*University of Pennsylvania, Perelman School of Medicine; Chemical Heritage Foundation, Frances K. Barg, Edward Emmett, Jody Roberts*

The goal of REACH is to provide information about public health, environmental justice, community engagement, and land use issues to the Superfund community of Ambler, PA and other communities affected by toxic substances. We conducted surveys with residents of Ambler and identified varying beliefs about the different resources used to reduce environmental health risks in the community. We have shared these results and other project materials with stakeholder groups to continue the dialogue about ways to engage with Superfund communities. We continue to engage elementary school students in schools and at the Philadelphia Science Festival to educate them on methods of removal and remediation of hazardous waste.

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### **RURAL STEM**

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#### **45. The MENTORS Project**

*Texas A & M Health Science Center, Robin Fuchs-Young*

The MENTORS project aims at actualizing an exportable model for the development of culturally relevant learning environments that stimulate interest in STEM careers. The project aids in addressing the critical issue of inadequate student preparation for and waning interest in STEM related careers in the US, which is especially pronounced among URM students. For this reason, the project focuses on schools in South

Texas ISD and Mercedes ISD. Unique to the project, MENTORS developed a 'Triad' model which us designed to link these ISD's with our Institution (Texas A&M) to aid in curriculum development, longitudinal mentorship, and student career development.

#### **46. Training Rural/Underserved Youth to Understand & Pursue Scientific Careers**

*University of Montana, Andrij Holian, Tony Ward*

The Clean Air and Health Homes Program provides students in rural communities the opportunity to do authentic research related to three common air pollutants: particulate matter, radon, and carbon monoxide. The program provides teacher professional development opportunities, equipment and curriculum to classrooms, and opportunities for students to present their research. Our external evaluation shows students who participate in the program have increased experimental design proficiency and improved self-efficacy in research skills, both of which are significant predictors of positive scientific possible selves (how students view themselves as scientists).

#### **47. Accelerating Access: Health Science Education in Native American Communities**

*University of Nebraska Medical Center, Maurice Godfrey*

The purpose of this program is to encourage partnerships between biomedical scientists, science educators, and American Indian community and school leaders that improve K-12 student and public understanding of the health sciences.

The objectives of the program are:

- To stimulate student interest in science...to increase the number of college science majors
- To develop higher science/technology competency in the workforce
- To improve society's science and health research literacy

The activities of the program are:

- Conduct Summer Workshops for K-12 Teachers
- Develop Hands-on Science Curriculum
- Implement Professional Development and Mentorship Teachers
- Summer Science Programs for Middle and High School Students
- Participate in Local Health Fairs and Powwows

#### **48. PIPES: Possibilities in Postsecondary Education and Science**

*University of Tennessee, Melinda Gibbons, Erin Hardin*

PIPES provides STEMM and college-going awareness information and activities to rural Appalachian high school students. Our poster will highlight our activities over the past two years as well as provide a summary of our collected research data.

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### STUDENT SCIENCE ENRICHMENT

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#### **49. Enhancing Secondary School STEM Education For Students and Teachers Through Biomedical Engineering Design**

*Columbia University, Aaron M. Kyle*

The Hk Maker Lab is a suite of interconnected programs meant to enhance STEM knowledge in New York City high school students from underrepresented minority groups and economically disadvantaged

schools. The Hk Maker Lab consists of (a) a summer program in which students are introduced to and apply the (biomedical) engineering design process; (b) a set of research or industry internships, which are meant to expose students to STEM-centric careers; and (c) the summer program functions as a professional development experience for high school teachers, where they can learn engineering design and create design classes or modules at their respective schools.

### **50. Seeing the Science of Drug Addiction: Conducting Independent Research with a Student Who Is Visually Impaired**

*East Carolina University, Rhea Miles*

A student who is visually impaired learns how to work independently to conduct SEADAP science investigations to prepare for the scientific workforce and to complete drug addiction research to participate in the regional and state science fair.

### **51. The Importance of Improving Underserved and Underrepresented Minority Youths' Attitudes Toward**

*Science: Validation of a Short Form Attitudes Toward Science Survey*

*East Carolina University, Melani Duffrin*

This poster describes the development and validation of a short form, 24-item, Attitudes Toward Science survey for utilization in future research aimed at improving underserved and URM youths' attitudes toward science. A researcher developed long form, 50-item, survey was administered in an intervention and comparison, pre- and post-implementation science education study (n=1,117). Exploratory factor analysis was conducted to reduce the original 50-item survey to the final 24-item form.

### **52. Engaging Families to Enhance Science Learning and Interest in STEM Careers**

*Seattle Children's Research Institute, Amanda L. Jones*

For this project, we measured the impact of two new curriculum modules delivered onboard Seattle Children's Research Institute's mobile science lab and two family-based activities, all of which were designed to encourage and support student learning and interest in science careers. Our data demonstrate content knowledge gains in understanding of body systems, vital signs, and brain functions among participating grade four students. We have also detected longer term retention of these gains in science learning and interest through assessments performed in fifth and sixth grade.

### **53. Translating Translation and Scientific Questioning in the Global K-12 Community**

*University of Arizona College of Medicine, Marlys H. Witte, Francisco Garcia*

Our overarching goal is to promote student curiosity, motivation, skills, networking, and career pathways in science, particularly to reinvigorate the clinical research enterprise. Our two complementary topics or themes are: How we find good questions to pose for research purposes, and – once we have completed a round of basic research – how we translate the knowledge and insights we have gained into end-points that address real-world issues and solutions that make a difference in the lives of others.

### **54. HiSCI**

*University of Hawaii, Kelley Withy*

Hawaii is working with teachers and students to create a cohort of science loving students to change the region. Through ongoing mentoring, equipment grants and fun science activities, 450 students are engaged in an ongoing program for career development and 50 teachers have received equipment and supplies to make science fun for students to learn.

## **55. Medicines and Me: Understanding and Using Medicines Safely**

*University of Rochester, Dina Markowitz*

Adolescents are uniquely prone to errors in self-administering medicines, and many adolescents have serious misunderstandings about potential risks of over-the-counter (OTC) medicines. The goal of our “Medicines and Me” project is to increase adolescents’ understanding of concepts essential for the safe use of OTC medicines and to increase their awareness of how medicines are developed. Our hands-on and minds-on “Medicines and Me” lessons are being disseminated to secondary school teachers throughout the US. We also created “Medicines and Me” field trip programs and community outreach activities that are led by scientists at University of Rochester’s Life Sciences Learning Center.

## **56. In-Classroom Biology Internships for Students and Teachers in Underserved Schools**

*Walter Reed Army Institute of Research, Debra L. Yourick*

The Gains in the Education of Math and Science (GEMS) Enrichment, in its third year, is designed to encourage student engagement in STEM, foster positive attitudes toward science, and enhance STEM learning through partnerships between schools and STEM research entities. The program is completing its second year of implementation in 9th grade biology classrooms, with near-peer mentors and school partners delivering NGSS-aligned, inquiry-based modules. Findings in Year 1 showed that enrichment participants scored higher on the Maryland High School Assessment in biology, passed this exam at a higher rate, and reported more positive attitudes toward science than the comparison group.

## **57. Pandem-Sim: Saving Earth with Biology**

*Wheeling Jesuit University, Charles Wood*

Pandem-Sim is a suite of three programs focused on the epidemiology of infectious disease outbreaks, epidemics and pandemics: 1. A live simulation immerses 11-12 grade students in the identification, control and treatment of outbreaks that develop around the world. 2. Pandem-Data introduces students to the use of Big Data to model outbreaks starting with Excel and moving to professional epidemiology software. 3. Pandem Disease Center is a collection of problem and case-based learning activities supported by life science resources and career information.

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## **TEACHER PROFESSIONAL DEVELOPMENT**

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## **58. Frontiers in Physiology: Building Communities of Practice**

*American Physiological Society, Marsha Lakes Matyas*

Our project includes 3 programs: an online teacher professional development course (OT), a research teacher fellowship, and regional teacher-researcher networks. Our focus this year was finalizing the OT curriculum and evaluation methods. The OT course seeks to increase MS/HS teacher knowledge, preparedness, and classroom use in six areas; Up-to-date content, Equity/Diversity, Technology, Assessment, Student-Centered Learning, and Reflection. Evaluation results from two cohorts (N=18) indicate significant increases in teacher knowledge and preparedness in all six areas. Classroom usage increased significantly in 5 areas in the short-term; this will be re-assessed later for long-term impacts.

## **59. The Exploratorium Digital Teaching Box Project**

*Exploratorium, Julie Yu, Hilleary Osheroff, Kristina Yu*

The Exploratorium is implementing an innovative teacher professional development program for middle and high school life science teachers designed to bring content related to health and biomedical research to students. Through workshops that include the participation of research scientists, teachers



will create Digital Teaching Boxes--a collection of electronic resources that will serve as interactive guides for teaching and learning the biomedical sciences.

### **60. Building Awareness, Respect, and Confidence through Genetics (ARC)**

*Harvard Medical School, Sanford Research, Marnie Gelbart, Ting Wu, Elizabeth McMillan*

Building Awareness, Respect and Confidence through Genetics (ARC) is a partnership between the Personal Genetics Education Project ([pgEd.org](http://pgEd.org)), the Sanford Program for the Midwest Initiative in Science Exploration (PROMISE), and teachers to bring the latest developments in genetics into classrooms and communities in Massachusetts and South Dakota. ARC is part of a broader initiative to engage high school students and communities in conversations about the benefits and implications of advances in personal genetics. Here, we present our progress creating a transdisciplinary curricular unit on genetics and identity, as well as initial outcomes from our first phase of professional development.

### **61. Turning K-12 Environmental STEM Education InSciEd Out**

*Mayo Clinic, University of Minnesota, Chris Pierret, James Cotner*

Through our program, Integrated Science Education Outreach (InSciEd Out), we intervene into student health, their environment and community. We call this integration of education and health "Prescription Education" (PE). Our aims include: 1) Implementation of PE with a focus on toxicology; and 2) the creation of a zebrafish resource for use in environmental toxicology. The successful completion of this work will result in: A strong teacher development program, Vetted K-12 classroom curriculum in Environmental Toxicity; A framework for scaling STEM interventions; and a molecular toolbox for improving STEM education through the use of the highly accessible zebrafish model system.

### **62. Teachers FIRST**

*Milwaukee School of Engineering, Tim Herman*

Empowering Teachers and Engaging Students – through modeling. As an instructional materials development laboratory, we engage high school teachers in rigorous professional development programs that update their knowledge of recent developments in the molecular biosciences while simultaneously connecting these new developments with foundational concepts that are traditionally taught at the high school level. Our approach is based on the use of physical models of molecular structures as a pedagogical approach to engage students' interest and encourage them to think deeply about the invisible molecular world. We also encourage teachers to value questions over answers, and to become active participants in the community of science.

### **63. Bringing Research Into the Classroom (BRIC)**

*Montana Tech, Marissa Pedulla*

One aim of the BRIC project was to provide meaningful, engaging professional development (PD) in which teachers pursue a rigorous research question. Ten teachers from cohort 1 have completed the two-year PD, including two summer research academies, two graduate courses, and one year-long independent research project culminating in a research report formatted for journal submission. Teachers' research projects, lessons learned during the delivery of summer academies, graduate courses, and mentoring of their projects will be discussed. Preliminary evaluation results suggest gains in cohort 1 (PD+classroom visits) vs. cohort 2 (classroom visit-only) teachers' content knowledge and research skills.

#### **64. Science Tools in the Classroom**

*New Mexico State University, Michele Shuster*

The first three years have focused on developing a summer workshop for teachers. The major goals have been:

- To enhance life sciences content knowledge
- To provide DNA-based classroom activities
- To help teachers develop their own DNA-based classroom activities.

After iterative improvements to the summer workshop (informed by teacher feedback), we have begun to direct efforts at enhancing the reach of the project, by sharing DNA-based activities to a broader audience. We have used a scholarly venue to share our PD approach with other STEM outreach groups, conference presentations, as well as our project website to share activities with teachers.

#### **65. Science Club Summer Camp: Training Teachers and Youth in Authentic STEM Practice**

*Northwestern University, Michael Kennedy*

Science Club Summer Camp (SC2) is an exciting new approach to NGSS-aligned elementary teacher professional development. Focused on 3rd grade teachers in Chicago Public Schools (CPS), SC2's three-week summer training model includes a series of intensive NGSS pedagogy workshops, grounded in a CPS curricular unit, followed by two weeks of "practicum" teaching at a Boys & Girls Club summer camp. In this way, teachers have the opportunity to learn and practice fundamental NGSS pedagogical shifts with the support of Northwestern master teachers and scientists, while 3rd grade camp youth learn valuable critical thinking and problem solving skills under the mentorship of caring STEM professionals.

#### **66. BEST Science! Bioscience Enrichment for Students and Teachers**

*Ochsner Medical Center- New Orleans; Louisiana State University Health Sciences Center, Jawed Alam, Paula Gregory*

The BEST Science! Program provides teacher professional development workshops, paired with Lab2Go Kits, to supplement high school science curriculum with the goal of advancing interest and understanding of biomedical research and health sciences in New Orleans area students. Post workshop, teacher knowledge and confidence in incorporating labs and advanced topics into their curriculum significantly increased. Analysis of student evaluations post Lab2Go Kit completion are expected to show similar increases in content knowledge and confidence. Overall, the BEST Science! Program is a highly effective tool for enhancing science interest and knowledge among New Orleans area teachers and students.

#### **67. Teaching the Genome Generation**

*The Jackson Laboratory, Charles Wray, Gareth Howell*

Teaching the Genome Generation (TtGG), managed by The Jackson Laboratory, is a multifaceted teacher professional development program focused on human genetics, ethics and bioinformatics through the lens of precision medicine. The primary goal of TtGG is to increase genomic literacy by training and reinvigorating high school teachers and ultimately to provide exciting and personally relevant laboratory experiences to nearly 4,000 students per year. TtGG trains high school teachers through an intensive professional development course and subsequently supplies portable laboratory equipment, reagents, and consumable supplies, as well as lesson plan and technical support throughout the academic year.

## **68. Modeling for Fidelity: Mentored Dissemination of a Novel Infectious Disease Curriculum**

*Tufts Medical School, Berri Jacque, Karina Meiri*

This study evaluates the impact of an innovative approach to teacher professional development designed to promote implementation of a novel high school curriculum on infectious diseases, part of the Great Diseases project. 'Modeling for Fidelity' is based on an ongoing mentor relationship between teachers and biomedical scientists carried out in a virtual format in conjunction with extensive online educative materials. Data addressing how teacher training relates to student outcomes suggests that this approach is an effective method of professional development that facilitates teacher implementation of novel cutting-edge curricula and is scalable beyond geographic limits.

## **69. The Great Diseases: Biomedical Science in the High School Classroom**

*Tufts Medical School, Karina Meiri, Berri Jacque*

US adults lack key competencies in STEM-related problem solving, and most teachers lack the scientific knowledge to teach about current health and disease topics, hence desirable jobs in life sciences and health care remain unfilled. This project aims to promote the analytical skills required for workforce preparation and health management by expanding teacher preparation in the context of our 'Great Diseases' high school curriculum. We are developing graduate-level courses for pre- and in-service teachers that contextualize content to classroom practice, utilizing online mini-courses and virtual interactions between teachers and mentors to increase access for teachers in underserved rural and urban areas.

## **70. Science Education Enabling Careers (SEEC)**

*University of Alabama at Birmingham, J. Michael Wyss*

SEEC BigData is a yearlong professional development program that enables secondary science teachers and students to decipher primary literature and large data sets. Nine teachers have been trained and taught over 300 students how to extract data from the primary literature (>750 articles on obesity in mice), enter them into a web portal, generate and test hypotheses related to this database and compete against other groups for data reliability and fidelity, creativity, and interpretations of results awards. Teachers found the material useful and the program increased their understanding of primary research articles and the assessment of big data sets.

## **71. Biomedical Explorations: Bench to Bedside**

*University of Florida, Mary Jo Koroly*

Biomedical Explorations: Bench to Bedside is a professional development program for secondary science teachers, focused on translational research, which integrates experiences from a summer institute into classroom action. Teachers work with science and education researchers to develop lessons and laboratory exercises that convey content-based principles in the context of career choices. Continued support from UF CPET encourages science teachers' personal enrichment and professional advancement in biotechnology education. Building upon these programs has led to the creation of the Summer Research Experience, a residential research fellowship program whereby teachers develop robust curricular modules that integrate clinical and translational research topics into existing classroom units, and are aligned with both state and national science standards.

## **72. T-SCORE: Teachers & Students for Community Oriented Research & Education**

*University of Kansas Medical Center, Paula Cupertino*

The T-SCORE (Teachers and Students for Community-Oriented Research and Education) overarching goal is to support a collaborative between University Kansas Medical Center and School Districts to improve health science teaching for underrepresented high school students and encourage them to pursue careers in the health sciences. With T-SCORE, health science teachers develop and implement new health science modules. These modules are contextualized with health disparities and embed the scientific inquiry process and Project Based Learning principles. In 2016, 5 KCKPS teachers participated in the T-SCORE Summer Institute, implemented health science units, and received ongoing professional development support.

## **73. STEMI: Growing a Community for Teacher Innovation in STEM**

*University of Mississippi Medical Center, Rob Rockhold*

Science Teaching Excites Medical Interest (STEMI), begun in 2016, engages Mississippi STEM teachers in a Community of Health Learners and development of expertise in flipped classroom pedagogy that focuses on major health needs of health literacy, social determinants of health and obesity. Partnering with Mississippi INBRE and COBRE programs, STEMI uses the Trellis ([www.Trelliscience.com](http://www.Trelliscience.com)) web-based community-building platform from the American Association for Advancement of Science, the Mississippi Telehealth system and collaboration with the Arizona SEPA program to advance and support networks for teacher excellence and pedagogical innovation.

## **74. Identifying, Assessing, and Visualizing Competencies for Teaching Science in a Flipped Learning Environment – The STEMI Competency Model**

*University of Mississippi Medical Center, M. Barnard, C. Copretta, E. Dehon, A. Notebaert, T. Pollard, D. Sullivan, E. Meyer, J. Taylor, S. Stray, R. Rockhold*

The Science Teaching Excites Medical Interest (STEMI) project seeks to develop and disseminate high school learning products that address obesity in Mississippi. Science teachers will be mentored to create and implement flipped lessons encouraging active student engagement. The STEMI model will only be effective if teachers develop key competencies necessary for successful implementation. The STEMI team is engaged in a collaborative, teacher-driven process to identify such competencies. A novel process is described with which to assess and visualize these competencies, to guide professional development, evaluate training program effectiveness, and critically examine the impact of teacher competencies on student outcomes.

## **75. Empowering K-12 Teachers Through a Bioscience Academy**

*UT Health Science Center at San Antonio, Michael Lichtenstein*

The Voelcker Bioscience Teacher Academy (VBTA) is a learning community of empowered public school teachers. This network works across schools and school districts to promote effective teacher professional development with 3 key strategies: Peer Mentoring (through STEM curriculum development, teacher-led pedagogical seminars, and conferences), Grant Writing (train teachers to obtain resources for their classrooms), Community Engagement (multi-disciplinary teacher teams directly support school science nights).

# GAMES, APPS, & EDUCATIONAL TECHNOLOGY DEMOS

**Thursday, June 1 – 4:15-5:30pm**

**Listed from younger to older audiences**

**PDF with active links available on the Conference website ([www.scied.info](http://www.scied.info))**

## **University of Georgia – Georgia W. Hodges**

**SYSTEMS: The Virtual Vet**

**Audience:** Elementary (Grades PK-5)

**Type:** Game

**Access:** This item is not available for public use yet. Please contact us for download instructions.

The SYSTEMS Virtual Vet is an immersive narrative in which elementary learners role play a veterinarian assistant tasked with treating our protagonist, Cookies, an overweight cat. Throughout the game, players treat Cookies while concurrently learning how obesity affects specific body systems. Students use lab equipment, apply computational skills, practice literacy skills, and communicate their findings throughout the narrative that currently addresses the musculoskeletal, gastrointestinal, and circulatory systems. In addition, we have created an individual chapter on human nutrition due to the goals of our project.

## **University of Utah Genetic Science Learning Center – Ryan Perkins & Steve Reest**

**The Neuroscience of Our Senses: Touch; Hearing; Balance; See; Smell & Taste**

**Audience:** Elementary School, Middle School, High School, Public/Family

**Type:** iOS apps; website

**Access:** Touch – iOS app available from iTunes Store; other apps will be available there soon

Website - <http://learn.genetics.utah.edu/content/senses/>

Five apps utilize the technology in iOS devices to engage users in learning about our sensory systems. Additional information on each sense is available online.

- **Touch App:** How does our skin know the difference between an icicle and a match? See how in a simplified slice of skin
- **Hearing App:** How does the anatomy of the inner ear separate and detect sound waves? Explore this app to find out.
- **Balance App:** Download Balance, then spin, shake, and watch. This app responds to your movements in real time, showing how the inner ear senses rotation, gravity, and acceleration.
- **See App:** Have you ever wondered what your dog sees? Download See and look through the eyes of a dog, an octopus, a color blind person, and more.
- **Smell & Taste App:** See how the nose and the tongue sense chemicals, and learn the difference between taste and flavor.

## **Michigan State University CREATE for STEM Institute – Renee Bayer**

### *Sand Rat Simulation*

**Audience:** Elementary School, Middle School, High School, Undergraduate, Public/Family

**Type:** Game; online simulation

**Access:** <http://models-resources.concord.org/sepa-models/lifespan.html>

Using the sand rat simulation, students investigate the effect of both genetic information and environmental factors on health. They plan and carry out an experiment using the simulation to collect and analyze data. They can then share and discuss their results and draw evidence-based conclusions.

### *SageModeler*

**Audience:** Middle School, High School, Undergraduate

**Type:** Game; online systems modeling tool

**Access:** <https://concord.org/building-models>

Michigan State University and the Concord Consortium are collaborating to examine how to support secondary school students in constructing and revising models based on disciplinary core ideas and crosscutting concepts to explain scientific phenomena and solve problems. We are iteratively designing, developing and testing a systems dynamics modeling tool to facilitate the building of dynamic models, and studying the quality of student-created models, the potential of these models to provide an explanatory framework across a range of core disciplinary ideas and the development of students' modeling capabilities.

## **Museum of Science and Industry, Chicago – Jason Dupuis**

### *MedLab Online*

**Audience:** Middle School, High School

**Type:** Website

**Access:** iPad browser

MedLab Online is a case study based health sciences program that uses the capabilities of the iPad to simulate real world medical tests that users complete in order to diagnose a virtual patient.

## **Milwaukee School of Engineering – Tim Herman**

### *Physical Models of CRISPR Cas9 .... and other kits to present protein structure/function and the flow of genetic information*

**Audience:** Middle School, High School, Undergraduate

**Type:** Website; physical models and manipulative kits

**Access:** MSOE Model Lending Library at <http://cbm.msoe.edu/lendingLibrary/index.php>

How can we expect students to get excited about proteins – if they are presented only as abstract words or flat, 2D schematic shapes in textbooks? One answer is to present proteins as complex 3D folded structures. We will illustrate this point using accurate 3D printed models of the CRISPR Cas9 protein – as well as a variety of other physical models that can be used to engage students' interest in the invisible molecular world.

## **National Cancer Institute, NIH – Katrina Theisz**

*CitSciBio- The Biomedical Citizen Science Hub*

**Audience:** High School, Undergraduate, Public/Family

**Type:** Website

**Access:** <http://citscibio.org/>

CitSciBio is sponsored by the National Cancer Institute, part of the National Institutes of Health. Our intent is to create an online collaboration space for the growing and virtually dispersed biomedical citizen science resources, projects, references, methods, and communities to be discovered by and engaged with interested stakeholders. This hub is designed to enable the community to be a resource for research, education, and collaboration in biomedical citizen science and crowdsourcing. The hub is free to join! Share, find, connect, collaborate on biomedical citizen science- together!

## **University of Arizona College of Medicine – Peter Crown**

*Virtual Clinical Research Center and Questionarium*

**Audience:** High School, Undergraduate

**Type:** iOS App; website

**Access:** App Store; <https://vcrcq.org/>

The VCRCQ app is the Virtual Clinical Research Center and Questionarium which emphasizes students asking questions. Students can interact with videos by biomedical researchers and in many cases, compare the questions they asked with those posed by the researchers. The app also contains a video library curricular topics and a resource center featuring CTSA and Infectious disease topics.

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