SciEd 2021: Annual Conference for NIH Science Education Projects

MAY 24 – 27, 2021

VIRTUAL

Executive Summary

NIH SciEd 2021

Held virtually during May 24-27, NIH SciEd 2021 was the ninth NIH-wide conference for science education projects funded by the National Institutes of Health. The 109 projects represented at the conference were funded by the following programs:

- Science Education Partnership Award (SEPA), National Institute of General Medical Sciences (82 projects)
- Youth Enjoy Science Research Education Program, National Cancer Institute (11 projects)
- Enhancing Neuroscience Diversity through Undergraduate Research Experiences (ENDURE), NIH Blueprint for Neuroscience Research (1 project)

The 412 conference registrants included 107 project PIs, 53 Co-PIs, 42 project managers, 81 project staff members, 9 internal evaluators, 15 external evaluators, 13 graduate students, 11 post-doctoral fellows, 9 teachers, 46 other individuals, 19 NIH staff (NIGMS, NHGRI, NCI, NIEHS, NIDDK, All of Us Research Program, Tribal Health Research Office, and Office of Data Science Strategy) and 7 staff from other federal agencies involved in science, technology, engineering and mathematics (STEM) education at the pre-kindergarten – grade 12 and public levels (National Science Foundation, U.S. Department of Education, and the U.S. Army Medical Research and Materiel Command).

The conference began with a keynote address by Jon R. Lorsch, PhD, director of NIH NIGMS, who highlighted the NIH strategic plan for data science and ways this focus is being implemented, including in SEPA projects. He also highlighted new initiatives in the IDeA program and NIGMS science education outreach efforts. In the next keynote address, Eliseo J. Pérez-Stable, MD, director of NIH NIMHD, spoke about health disparities, their effects on children, and promoting health equity for all youth. And in a third keynote, Maryam Zaringhalam, PhD, AAAS Science & Technology Policy Fellow and Senior Producer at the StoryCollider, gave an inspiring presentation about the power of storytelling for engaging people in science. On the second morning of the conference, Leslie Goodyear, PhD, Principal Research Scientist at the Education Development Center, highlighted the elements of high-quality project evaluations. On the final day of the conference, plenary and breakout sessions focused on preparing competitive grant proposals.

Twenty-nine breakout sessions addressed broadening participation, curriculum development, informal science education, research experiences for students and teachers, science teaching and learning, teacher professional development, research and evaluation, and project administration.

Eighteen roundtable discussions provided opportunities to learn from other projects in an informal, small-group format. The NCI YES program also held a satellite PI meeting. All projects were invited to present a poster about their work during one of two poster sessions and to give a 1-minute "Flash" talk highlighting their poster. Participants reported that the most valuable things they gained from the conference were learning about and from other projects; learning about evaluation tools and resources; learning about other funding options; and--as always--networking, reconnecting, and finding new collaborators.

Acknowledgements

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

Conference Support
Partial funding for this conference was provided by Cooperative Agreement U13GM129167from the National Institute of General Medical Sciences, 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.

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Conference Organizing Committee

SciEd 2021

Conference Co-Chairs

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

Dina Drits-Esser, PhD, Assistant Director for Research and Evaluation, Genetic Science Learning Center, University of Utah

Broadening Participation Strand

Luke Bradley, PhD, Professor of Neuroscience, and Molecular and Cellular Biochemistry, University of Kentucky

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

Curriculum Development Strand

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

Carla Romney, DSc, MBA, Boston University School of Medicine

Informal Science Education Strand

Julia McQuillan, PhD, Willa Cather Professor of Sociology, University of Nebraska, Lincoln

Bonnie Sachatello-Sawyer, Executive Director, Hopa Mountain

Dina Drits-Esser, PhD, Assistant Director for Research & Evaluation, Genetic Science Learning Center, University of Utah

Interactive Multimedia Strand

Adam Hott, PhD, Digital Applications Lead, Expanding Solutions Expert, HudsonAlpha Institute for Biotechnology

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Project Administration Strand

J. Michael Wyss, PhD, Professor and Director, Center for Community Outreach Development, University of Alabama at Birmingham

Research and Evaluation Strand

Alana Newell, PhD, Assistant Professor, Center for Educational Outreach, Baylor college of Medicine

Loran Carleton Parker, PhD, Associate Director, Senior Research and Evaluation Associate, Evaluation & Learning Research Center, Purdue University

Research Experiences for Students and Teachers Strand

Gwendolyn Stovall, PhD, Assistant Professor of Natural Sciences, University of Texas at Austin

Nathan Vanderford, PhD, MBA, Assistant Professor of Toxicology and Cancer Biology, University of Kentucky

Science Teaching and Learning Strand

Kristin Bass, PhD, Director of Research Development, Rockman et al

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

Teacher Professional Development Strand

Robin Fuchs-Young, PhD, Professor of Molecular and Cellular Medicine, Texas A&M University

Atom Lesiak, Director of Education Outreach, Genome Sciences, University of Washington

Virginia Stage, PhD, RDN, LDN, Assistant Professor of Nutrition Science, East Carolina University

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Keynote Address

Monday, May 24, 2021 – 11:00 AM – 12:00 PM

NIGMS Update

Presenter: Jon R. Lorsch, Ph.D., Director, National Institute of General Medical Sciences

Five-Year Strategic Plan. Conference attendees were encouraged to review the newly released NIGMS strategic plan. Shaped by input from multiple stakeholders, the plan specifies the direction and priorities that NIGMS will pursue over the next five years.

Upcoming Fall Lectures. Two upcoming fall lectures of potential interest to the SEPA community were discussed. The first lecture will form part of the Judith H. Greenberg Early Career Investigator Lecture Series. The second lecture will be hosted in connection with the annual NIGMS Stetten Lecture. Visit the following URLs for more information on each lecture:

https://www.nigms.nih.gov/News/meetings/ECI/

https://www.nigms.nih.gov/News/meetings/Pages/2021-stetten-lecture.aspx

Pathways Magazine and Related Resources. The wide-reaching, student-centered Pathways magazine is published bi-annually through an ongoing partnership between NIGMS and Scholastica, Inc. The fifth issue on microscopic imaging was recently released and made available online free-of-charge along with other supplemental resources. Visit the following URL for more information on the full suite of Pathways resources available to students and teachers: https://www.nigms.nih.gov/education/pathways

NIGMS Training Webinars on Demand. A series of broad-interest, NIGMS-hosted webinars were delivered in the summer and fall months of 2020. The webinars, which targeted trainees of all levels (from high school students, to postdoctoral fellows, to faculty), covered a range of biomedical and career development topics. The webinars are available free-of-charge on the NIGMS YouTube Channel.

The NIH UNITE Initiative. The NIH-wide UNITE Initiative consists of five committees that are charged with reducing racism and discrimination in the biomedical research enterprise. Dr. Lorsch co-chairs the E committee, which is charged with performing a broad, systematic evaluation of NIH's extramural policies and procedures to identify and change practices and structures that

perpetuate a lack of inclusivity and diversity within the extramural research ecosystem. The committee targets four key areas: career pathways for members of underrepresented groups; inequities at extramural institutions; inequities at NIH that affect inequities at extramural institutions; and limited resources/capacity at HBCUs, TCUs, and MSIs.

The SEPA community has attracted significant interest from E Committee members given its role in developing underrepresented youth programming centered on biomedical career pathways.

To support the UNITE Initiative, NIGMS released a Notice of Special Interest for grant applications, which can be accessed at the following URL:

https://grants.nih.gov/grants/guide/notice-files/NOT-GM-21-033.html

The National Institute on Minority Health and Health Disparities released a related funding announcement that can be accessed at the following URL:

https://grants.nih.gov/grants/guide/rfa-files/rfa-md-21-004.html

Childcare for NIH Fellows and Trainees. To help remove a significant barrier to career progression for groups underrepresented in biomedical research, the NIH will provide NRSA fellows and training grant recipients with $2500 to cover childcare costs (refer to NOT-OD-21-074 for more information).

NIGMS Supplement Opportunities. NIGMS issued several supplement opportunities in 2021. Equipment supplements were awarded to research grantees. Additional supplements supported training grant enhancements in a variety of areas. NIGMS supplements also provided stipends for undergraduates participating in summer research programs, and funding to enhance projects rooted in data science-related areas (e.g., AI/ML, FAIR Data, Open Software)

NIGMS-STRIDES Cloud Computing Pilots. NIGMS has been working closely with the NIH Office of Data Science Strategy and Center for Information Technology to develop strategies that provide students and investigators with reduced-cost access to cloud services. Students and investigators from institutions supported by the IDeA and TWD Diversity Enhancing Program are eligible to participate in cloud training and research credit programs.

Other Supplement Opportunities. Additional supplements were awarded to identify COVID-19 variants (IDeA and NARCH grantees) and to understand and reduce COVID-19 vaccine hesitancy (IDeA, NARCH, and SEPA grantees). To support research using COVID-19 patient health records, IDeA Clinical and Translational Research Centers were given supplemental funding to transfer records to N3C. NIGMS-funded researchers involved in infectious disease modeling also received supplemental funding to either initiate or expand COVID-19 modeling research.

MIDAS Coordination Center. Based at the University of Pittsburgh, the MIDAS coordination center coordinates and facilitates infectious disease modeling through a nearly 700-member network. MIDAS serves as a point of contact for public health agencies and provides access to curated datasets, models, algorithms, code, parameters, and cloud computing services. Attendees were encouraged to review the resources available to the MIDAS membership base, which is also open to students.

Areas of Interest for SEPA (from the perspective of NIGMS). Dr. Lorsch concluded his talk by encouraging the SEPA community to strengthen or develop new learning opportunities that enhance students' computational and quantitative reasoning skills, identify opportunities to form robust partnerships with other NIGMS programs (e.g., SEPA, IDeA, NARCH, RISE, Bridges to Baccalaureate, etc.), and incorporate real-world datasets in SEPA projects (including those available from *All of Us*, MIDAS, N3C, etc.). To assist NIGMS in its efforts to highlight the importance of the SEPA program, conference attendees were also encouraged to share success stories of their programs (anecdotes, quantitative and qualitative outcome data, etc.) with NIGMS.

Concurrent Breakout Sessions

Monday, May 24, 2021 – 2:00 PM – 3:00 PM

Practices to Overcome Barriers to STEM Learning – Programs for First Generation, Urban and Rural Participation

PANELISTS:

DEBRA YOURICK, PHD, DIRECTOR, SCIENCE EDUCATION AND FELLOWSHIP PROGRAMS, WALTER REED ARMY INSTITUTE OF RESEARCH

ELIZABETH PARKER, PHD, ASSISTANT PROFESSOR, UNIVERSITY OF MARYLAND BALTIMORE

MELINDA GIBBONS, PHD, PROFESSOR, UNIVERSITY OF TENNESSEE

ERIN HARDIN, PHD, PROFESSOR, UNIVERSITY OF TENNESSEE

For this multifaceted breakout, three programs brought broad experience and insights to overcoming barriers in STEM learning. The WRAIR program, Gains in Education of Mathematics and Science (GEMS), which serves primarily urban participants from underserved schools), first developed near-peer mentoring as a tool to reduce barriers to STEM learning by matching participants and near age mentors from similar backgrounds to enable more effective STEM hands-on learning. Programming now extends from the original summer program to in-classroom interventions that show significant effects to improve science attitudes and efficacy. Summer stipends for both near-peer mentors (NPMs) and all participants also reduce barriers if participants must forego summer jobs or incur the cost of lunches and travel. Dr. Yourick and her team engage with local organizations/schools to engage both NPMs and participants (HBCUs, MSIs, and community groups). The Imagining Possibilities/PiPES program at the University of Tennessee serves low income, rural Appalachian high school students across this broad geographic range. Seeking to build a culturally sensitive career program means also connecting with community stakeholders through listening and hard work to address the specific concerns of this rural group including too little exposure to career options due to the lack of role models and career information as well as other barriers such as the lack of college funding and AP/advanced course options. The program leads, Drs. Gibbons and Parker have prepared well with past research and scholarship and are seeking to create a specialized educational program based on social cognitive career theory. Led by Dr. Parker, the University of Maryland Baltimore Continuing Research Experiences (UMB CURE) Scholars program offers STEM enrichment for middle school students in extremely disadvantaged West Baltimore communities. Specially trained mentors are from UMB professional schools. Activities are held on Saturdays, but programming has expanded not only beyond Saturday but to high school participants as well, based on the availability of new mentor recruitment. Family engagement is underway. Efficacy for all these programs is assessed through quantitative and qualitative measures to determine impacts.

Participants:

Ellen Alderton
Maria Alvarez, El Paso Community College
Carmela Amato-Wierda, University of New Hampshire
Julie Bokor, University of Florida
Renee Boney-Jett, University of Minnesota
Anissa Brown, NIH/NIGMS
Kate Buckman, Dartmouth College
Karen Burns-White, Dana-Farber/Harvard Cancer Center
Manetta Calinger, Wheeling Jesuit University
Jessica Calzola, NIH/NCI
Rochelle Cassells, University of Utah
Donna Cassidy-Hanley, Cornell University
Ellen Chenoweth, University of Alaska Southeast
Christina Chhin, Institute of Education Sciences/US Dept of Education
Victoria Coats, Oregon Museum of Science & Industry
Clayton Coffman, Vanderbilt University
Carol Colaninno, Southern Illinois University Edwardsville
Jamie Cornish, Montana State University
Ruben Dagda, University of Nevada, Reno
Behrous Davani, NIH/NIGMS
Brittney Edwards, University of Texas MD Anderson Cancer Center
Nico Ekanem, Walter Reed Army Institute of Research
Sara Erickson, Iowa State University
Michelle Ezeoke, Georgia State University
Jenica Finnegan, University of Nevada, Reno
Sean Freeland, West Virginia University
Marnie Gelbart, Harvard Medical School
Becky Gonda, University of Pittsburgh
Ben Gorski, University of Maryland Baltimore
Kathleen Gray, The University of North Carolina at Chapel Hill
Ben Greenfield, University of Southern Maine
Tyler Gumpel, NYU Langone Health
Bret Hassel, University of Maryland
Susan Hershberger, Miami University
Megan Hochstrasser, University of California, Berkeley
Dave Holben, University of Mississippi
Belen Hurle, NIH/NHGRI
Annika Hvide, Children's National Hospital
Berri Jacque, Tufts University

Larry Johnson, Texas A&M University
Megan Keniry, The University of Texas Rio Grande Valley
Mary Jo Koroly, University of Florida
Aaron Kyle, Columbia University
Mary Larson, Salish Kootenai College
Kara Lewis, MD Anderson
Sondra LoRe, University of Tennessee
Teresa MacDonald, University of Kansas
Lisa Marriott, Oregon Health & Science University
Megan MeKinda, University of Chicago
Brittany Michel, Dana-Farber/Harvard Cancer Center
Mia Minen, University of Tennessee, Knoxville
Anjan Nan, University of Maryland, Eastern Shore
Bruce Nash, Cold Spring Harbor Laboratory
William Pacetti, University of Miami
Andrea Panagakis, Salish Kootenai College
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
David Petering, University of Wisconsin-Milwaukee
Emaly Piecuch, The Jackson Laboratory
Misty Pocwierz-Gaines, University of Nebraska Medical Center
Sarah Praskievicz, The University of North Carolina at Greensboro
Jill Rhoden, University of Texas at Austin
Patrice Saab, University of Miami
Bonnie Sachatello-Sawyer, Hopa Mountain
Mziya Sarishvili, University of Hawai'i at Manoa
James Skeath, Washington University in St Louis
Joyce Solheim, University of Nebraska Medical Center
Valerie Solon, Tufts University
Gwendolyn Stovall, University of Texas at Austin
Allison Stranick, Temple University
Brittany Swift
Laura Tenenbaum
Anastasia Thanukos, University of California, Berkeley
Abbey Thompson, The Tech
Jackie Valett, Emory University
Dave Vannier, Fred Hutch Cancer Research Center
Michele Ward, Texas A&M University
Anne Westbrook, BSCS Science Learning
Fara Williams, University of Kentucky
Sequoia Wright, University of Maryland, Baltimore

Concurrent Breakout Sessions

Monday, May 24, 2021 – 2:00 PM – 3:00 PM

Strategies for Facilitating Public Access to Educational Products Resulting from SEPA Projects

FACILITATORS AND PRESENTERS:
SANDRA SAN MIGUEL, DVM, PHD, ASSOCIATE DEAN FOR ENGAGEMENT, PURDUE UNIVERSITY COLLEGE OF VETERINARY MEDICINE
LILIANA BRONNER, MHSA, MBA, ASSISTANT PROFESSOR AND CLINICAL EDUCATION MANAGER, DIRECTOR, MEDICAL PATHWAYS, UNIVERSITY OF NEBRASKA MEDICAL CENTER

This session continued the conversation held after the 2020 NIH SciEd Conference to explore mechanisms by which educational items (e.g., books, games, science kits, models) from ALL SEPA projects can be made available to the public while returning income to the SEPA program for donation to underserved audiences or to generate additional supplemental SEPA funding. The presenters emphasized the novelty of a government hosted store that serves as a distribution and/or sharing point for project items (only one example to draw upon!). Liliana Bronner presented her experiences navigating the technology transfer process, negotiating a sales price, and finding a vendor (Nebraska Scientific). Sandy San Miguel presented her experiences with crowdfunding to disseminate SEPA products, as sales were not feasible at her institution. Both presenters emphasized the trials of starting this process and the importance of reliable and trustworthy partners. Jason Nickla presented considerations for avoiding infringement on intellectual property rights, breaching contracts, respecting government rights, managing and processing funds appropriately, and following applicable laws. Reference links for further consideration were provided. A poll found that many were not distributing their products beyond the target audience, or if they were, distribution was by free download. Some expressed concerns that their products were not easily distributed or too expensive to distribute. The breakout concluded with a proposal for hosting a central virtual "SEPA Store" on the NIH SciEd website where SEPA products could be viewed by the public as tiles that link to all our respective products. As a result, the PI could select the distribution method (Online sales, Giving pages, Free Download), and products could be sorted by Product Type, Age Group, Free or Fee. Seven participants indicated they would be interested in participating in such an initiative, two were not interested, and two indicated they might participate. Participants suggested that teacher professional development opportunities/certifications could also be made available.

Participants:

Renee Bayer, Michigan State University
Julie Bokor, University of Florida
Asa Bradman, University of California Merced
Deanna Buckley, University of Texas at Austin
Jessica Calzola, NIH/NCI
Clayton Coffman, Vanderbilt University
Dina Drits-Esser, University of Utah
Adrianne Fisch, Purdue University
Katharina Furrs, University of Maryland, Baltimore
Maurice Godfrey, University of Nebraska Medical Center
Joan Griswold, University of Washington
Megan Hochstrasser, University of California, Berkeley
Lauren Johnson, Washington University

Brinley Kantorski, Partnerships in Prevention
Adel Karara, University of Maryland Eastern Shore
Stephen Koury, University at Buffalo
Meghan Leadabrand, University of Nebraska, Lincoln
Atom Lesiak, University of Washington
Lindley McDavid, Purdue University
Brittany Michel, Dana-Farber/Harvard Cancer Center
Julia Miller, Children's National Hospital
Mia Minen, University of Tennessee, Knoxville
Caitlin Nealon, The Tech Interactive
Jason Nickla, University of Nebraska Medical Center
Carlos Penilla, University of California San Francisco
Tandy Petrov, The University of Alabama at Birmingham
Carla Romney, Boston University
Dara Ruiz-Whalen, eCLOSE Institute
Teresa Schiff, University of Hawaii
Jyoti Singh, NIH/NIGMS
Kim Soper, University of Nebraska Medical Center
Katie Sterling, Boston University
Sarah Will, Partnerships in Prevention
Charles Wood, Wheeling University
Kristine Wylie, Washington University

Concurrent Breakout Sessions

Monday, May 24, 2021 – 2:00 PM – 3:00 PM

Using STTR/SBIRs to Position Great Programs to Sustain Themselves

MODERATOR:
J. MICHAEL WYSS, PHD, PROFESSOR AND DIRECTOR, UNIVERSITY OF ALABAMA BIRMINGHAM
PANELISTS:
MELISSA GILLIAM, MD, MPH, VICE PROVOST AND PROFESSOR OF OBSTETRICS AND GYNECOLOGY AND PEDIATRICS, UNIVERSITY OF CHICAGO
TIM HERMAN, PHD, DIRECTOR, MSOE CENTER FOR BIOMOLECULAR MODELING, MILWAUKEE SCHOOL OF ENGINEERING
JAMES LESTER, PHD, DIRECTOR, CENTER FOR EDUCATIONAL INFORMATICS & DISTINGUISHED UNIVERSITY PROFESSOR OF COMPUTER SCIENCE, NORTH CAROLINA STATE UNIVERSITY
DINA MARKOWITZ, PHD, PROFESSOR OF ENVIRONMENTAL MEDICINE AND DIRECTOR, LIFE SCIENCES LEARNING CENTER, UNIVERSITY OF ROCHESTER
TONY BECK, PHD, PROGRAM DIRECTOR, SCIENCE EDUCATION PARTNERSHIP AWARD, DIVISION FOR RESEARCH CAPACITY BUILDING, NIGMS, NIH
ROBERT RUSSELL, PHD, PROGRAM DIRECTOR, NSF

This session focused on how STTR/SBIR mechanisms can be used to share excellent tools that were developed initially in a SEPA or similarly funded program. Initially, Dr. Beck explained the general type of funding available in the STTR/SBIR (Phase 1 and 2) grants and how one might think about them as extensions to SEPA findings. Dr. Gilliam followed this up with a discussion about the board games that were initially developed in their SEPA and how the STTR/SBIR mechanism allowed them to scale up their distribution, testing and development of the board games. They have created a social impact company with the support of many university resources and programs. The company has been a great partner allowing them to try many new ideas and eventually to disseminate to more people. She cautioned, as did others, that investigators need to be aware of the conflict-of-interest issues. Dr. Herman followed this up with a discussion of the models of genes and proteins that he has been creating for well over a decade at his company, leading to the development of technology by a sister organization, 3D Molecular Designs, which has in turn led to the broad dissemination of the instructional materials that have resulted from their SEPA projects. He also talked about business practices that he has employed, including hiring family members. While some STTR/SBIRs make a lot of money, others are more useful in getting great learning tools to the public, but less profitable. Dina Markowitz spoke about her well recognized Science Take Out company and considered some of the developmental challenges that she faced and faces. Overall, her company, with the support of SEPA and STTR/SBIR grants, has developed 39 classroom kits

that are widely used. Dr. Lester considered the role of SBIR/STTRs relative to computer education. He also described his software start-up founder experience, which took a venture-backed approach, and contrasted it with the SBIR/STTR approach, and he discussed two advantages of the SBIR/STTR approach: 1) it avoids the "multiple reports" problem posed by having large numbers of angel investors, and 2) it avoids the dilutive impact of venture-backed approaches. Finally, Dr. Russell discussed NSF's programs and some of the similarities and differences from that of NIH. He also offered examples of innovative areas that might be favorably viewed by the review panel, e.g., distance learning, including online learning, cyberlearning, learning engineering – use of data sciences to extract actionable evidence-based insights about learning, efficient delivery methods that account for socioeconomic and technology disparities. Solutions may draw on technical tools from IT, AI, AR/VR, HCI, social or technical networking platforms, communications technologies, etc.

Participants:

Renee Bayer, Michigan State University
Craig Berg, University of Wisconsin-Milwaukee
Thomas Boland, University of Texas at El Paso
Katherine Bruna, Iowa State University
Michael Carvan, University of Wisconsin-Milwaukee
Melani Duffrin, Northern Illinois University
Jacqueline Genovesi, Drexel University
Maurice Godfrey, University of Nebraska Medical Center
Ella Greene-Moton, University of Michigan
Nicholas Hindy, College of Charleston

Megan Hochstrasser, University of California, Berkeley
Bethany Hornbeck, Apis Creative
Ralph Imondi, Coastal Marine
Michael Kennedy, Northwestern University
Mary Jo Koroly, University of Florida
Neil Lamb, HudsonAlpha Institute for Biotechnology
Julia McQuillan, University of Nebraska – Lincoln
Catherine Morton, West Virginia University

Janice Straley, University of Alaska Southeast

Carlos Penilla, University of California San Francisco
Tandy Petrov, The University of Alabama at Birmingham
Kevin Phelan, University of Arkansas for Medical Sciences
Rob Rockhold, University of Mississippi
Debbie Shen, Exploratorium Teacher Institute
Joyce Solheim, University of Nebraska Medical Center
Kim Soper, University of Nebraska Medical Center

Concurrent Breakout Sessions

Monday, May 24, 2021 – 2:00 PM – 3:00 PM

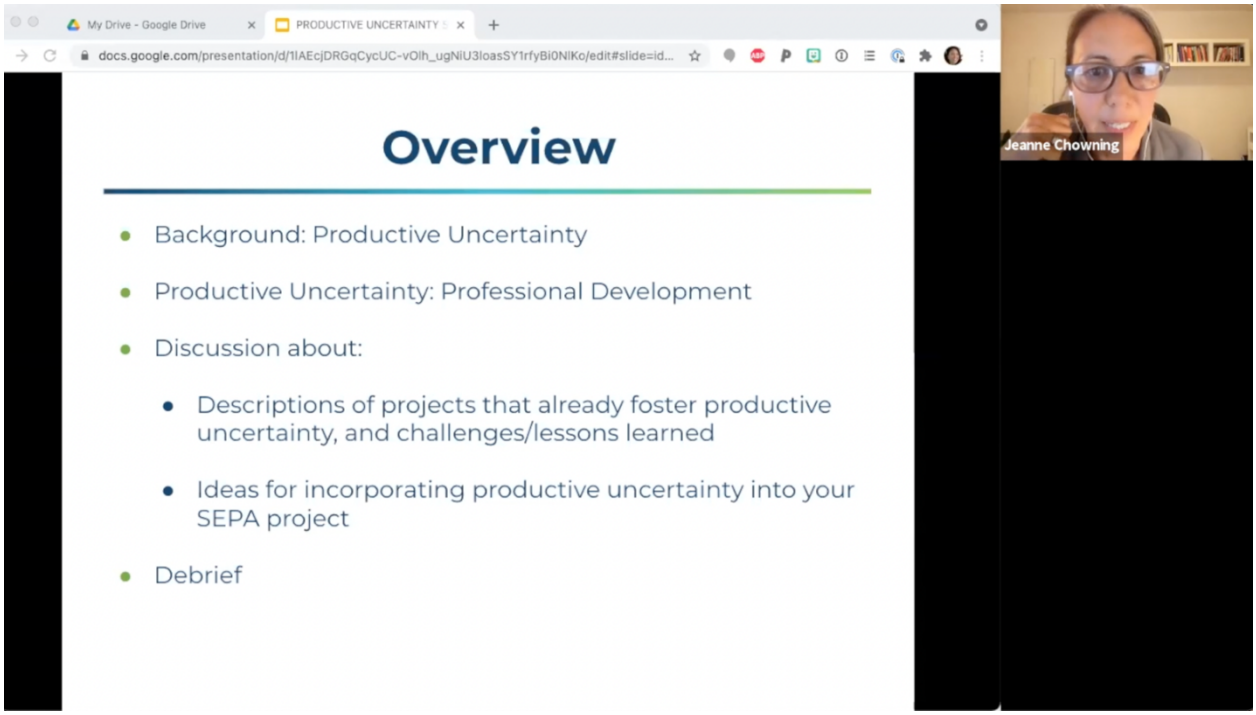
Productive Uncertainty and Curriculum Development Discussion

FACILITATORS:
REGINA WU, BA, PROGRAM MANAGER, FRED HUTCHINSON CANCER RESEARCH CENTER
JEANNE CHOWNING, PHD, SR. DIRECTOR – SCIENCE EDUCATION, FRED HUTCHINSON CANCER RESEARCH INSTITUTE

This session first provided background in the idea of Productive Uncertainty, as described by Eve Manz (2018). Participants were provided time to read the STEM teaching tool #60, which describes how "uncertainty might be strategically built into learning environments so that students establish a need for scientific practices and experience them as meaningful ways of developing understandings." Participants then reflected on and discussed what productive uncertainty looks like in a classroom, and compared it to instances of productive certainty, unproductive certainty, and unproductive uncertainty. We discussed an article that can be used as a seminar reading for students, which explores these ideas ("The importance of stupidity in scientific research") and briefly described the value of seminars for exploring such topics. We also shared comments from teachers who had observed uncertainty in scientific settings during professional development and had expressed their desire to bring elements of that uncertainty in productive ways back to their classrooms. Several of these teachers had created a new lesson (published in NSTA's Science Teacher) about DNA extraction that incorporated ideas of productive uncertainty by allowing students agency over protocol design, and opportunities for social discursive argumentation about the best procedure. The session closed with opportunities for participants to discuss (in small breakout groups) productive uncertainty in their own projects. They addressed the following questions: If you already incorporate elements of productive uncertainty into your materials, what do you already do that introduces productive uncertainty? What have some of the successes/challenges been? If not, what are some of the potential ways to incorporate productive uncertainty into your project? The session concluded with an opportunity for small groups to share out highlights from their discussion.

Link to slides:
https://docs.google.com/presentation/d/1IAEcjDRGqCycUCvOlh_ugNiU3loasSY1rfyBi0NlKo/edit?usp=sharing

Link to Resources associated with the presentation:
https://docs.google.com/document/d/1r459U_pcwlz4ZJq2kK2Tesp45BzH9lfQwX73YxCoSCo/edit?usp=sharing



Participants:

Julie Bokor, University of Florida
Desmond Campbell, Vanderbilt University
Donna Cassidy-Hanley, Cornell University
Ang Chen, University of North Carolina at Greensboro
Dina Drits-Esser, University of Utah
Martina Efeyini, University of Maryland, Baltimore
Kristin Fenker, University of Utah
William Folk, University of Missouri
Dana Haine, University of North Carolina at Chapel Hill
Mary Kay Hickey, Cornell University
Sheila Homburger, University of Utah
Barbara Hug, University of Illinois Urbana-Champaign
Tania Jarosewich, Censeo Group
Amanda Jones, Seattle Children's Research Institute
Molly Kelton, Washington State University
Julie Lucero, University of Nevada, Reno
Molly Malone, University of Utah
Revati Masilamani, Tufts Medical School
Allison McQueen, Tuft University
Kauionalani Mead, Hawaii/Pacific Basin Area Health Education Center
Jasmina Mesic, FoodMASTER
Daniel Meyer, Northwestern University
Brittany Michel, Dana-Farber/Harvard Cancer Center
Brandon Morgan, Health Resources in Action
Megan Morrone, Rockman Et Al
Cynthia Nazario-Leary, University of Florida
Caitlin Nealon, The Tech Interactive

Robyn Pennella, St. Jude Children's Research Hospital
Carla Romney, Boston University
Anja Scholze, The Tech
Louisa Stark, University of Utah
Katie Sterling, Boston University
Jen Taylor, University of Utah
Michele Ward, Texas A&M University
Robin Wilson, Temple University
Sarah Wojiski, The Jackson Laboratory
Charles Wray, The Jackson Laboratory

Concurrent Breakout Sessions

Monday, May 24, 2021 – 2:00 PM – 3:00 PM

The Making of Zoom Fatigue: PBS NewsHour Student Reporting Labs Health Fellowship

ORGANIZER:
LEAH CLAPMAN, BA, EXECUTIVE DIRECTOR, PBS NEWSHOUR STUDENT REPORTING LABS
PANELISTS:
ELI KINTISCH, BA, YOUTH MEDIA PRODUCER, PBS NEWSHOUR STUDENT REPORTING LABS
JOHN BARNES, HIGH SCHOOL STUDENT, STUDENT PRODUCER, PBS NEWSHOUR STUDENT REPORTING LABS

"The Making of ZOOM Fatigue" session on Monday May 24 was unique and fun because it was led by two students who were part of the SEPA Student Health Reporting Labs program.

The session began with the work of John Barnes who started working with SRL back in December 2019. John was named a 20 under 20 storyteller at the end of 2020 and completed two fellowships with SRL. His Zoom Fatigue video aired live on Weekend NewsHour. SRL student Khulan Erdenedalai described her explainer video about the air pollution crisis in Ulaanbaatar, Mongolia and how she is conducting remote interviews and coaching subjects to film their own b-roll.

The students helped session participant Katie Sterling think through video storytelling for the CityLab project. They also took questions from Marisa Pedulla, Montana Technological University, Teresa Schiff, Area Health Education Center at the University of Hawaii and John A. Burns School of Medicine, and Ivan Lamas-Sanchez, UMB Cure, and discussed how to scaffold student work to ensure small successes early on with small assignments. The students shared resources that SEPA leaders can use to produce video content that tells the story of their work.

John said that the biggest challenge was balancing simple comedic sketches with complex scientific explanations, along with making sure the video's core message wasn't compromised. Some things that helped: Transcribing interviews, making real life drawings, asking the right questions during interviews, using the sketches to explain the complex topics.

John continued: "Personally, science is one of my weaker subjects, but making this video really taught me a lot about scientific research and how to have a better understanding of it. Journalism, specifically these explainer videos, provide a platform for young creators like me to dive deeper into their passions and further research them. It also gives us a voice! Many teenagers feel like they can never speak up on important issues and these videos are the perfect place to for us to get our message across."

Below are the student answers to the questions raised during the session. John is Blue and Khulan is Red.

Tell us about the interviews - what was that like to talk to the experts?

- It depends on the person obviously, but both the experts I talked to were extremely friendly and well versed in their subjects. I really enjoyed talking to Dr. Jena Lee. I was really nervous that I wasn't going to ask her enough questions.

- I spoke with Dr. Braham, a professor at the University of Pennsylvania about technological solutions to the air pollution crisis in Ulaanbaatar. He was super friendly, and he connected me with other project leaders in Mongolia. The conversations we had were super eye opening and informative to me.

How did you figure out who to interview?

- I actually emailed some of the people who wrote the articles I used for research! I realize now that an interview with the original author may not go beyond the surface from what was written in the article, but both of the experts I talked to really went in depth about the subjects, specifically Dr. Jena Lee who explained every aspect of the brain to me and explained how I could improve my mood. You also have to bug people in a polite way if they aren't responding. Professor Shuffler responded immediately but it took me a lot of follow up emails with Dr. Lee's assistant asked her to respond at first. I actually sent Dr. Lee a message on LinkedIn and I think that's what got the ball rolling. I'm glad I kept following up because she provided me with one of my favorite interviews I've ever done for a project! For other projects I've done, I usually have to research on Google and find articles that contain an author who is easily accessible to email. Luckily in the case of Zoom fatigue, both people who I wanted to interview were pretty easy to find.

- I was reading an article about a project by UPenn (partnered with UNICEF) to combat air pollution by making Mongolian yurts more energy efficient. I emailed the leader of the project, Dr. Braham, and he was happy to talk to us. He then, connected us with GerHub and we interviewed people in Mongolia working to solve this problem.

How did you prepare for the interview?

- Honestly, I think the hardest part of preparing for interviews is just trying to stay calm five minutes before. Even if I don't feel anxious in my head, my body sure does. The best thing you can do is just break the ice as soon as possible, which I actually learned from Dr. Lee! I usually already know what questions I'm going to ask just from my research that I've already

done, so that part is not too hard. I am also pretty good at reading my interview subject and knowing how to ask other important questions on the spot.

- I prepared the questions beforehand and hopped on a call with my producer 15 minutes before the interview to edit and/or add more questions. Since I conduct a lot of interviews, I wasn't feeling too nervous. One challenge was scheduling the meetings and finding a time that works because one of my interviewees was in Japan.

You make this compelling with humor - talk to us about your approach to video making.

- I think I've always sort of been known for having some kind of intuition when it comes to comedy (well at least that's what my old film teacher said regarding my films). I started off my narrative films within the comedy genre from a young age so I think that's why I tend to incorporate humor within all of my projects, even if they are dramatic films or documentary and explainer videos like Zoom fatigue. One thing about our world is that it's not just 100% comedy or drama in everyday life. We tend to have both in each situation, so it wouldn't be realistic for me to just focus on one. Furthermore, I thought people would get bored without any sort of sketches or comedy that didn't break the form. If you want someone to keep watching your video, I think you have to be constantly adding something new and exciting, even if it's just a subtle change like some text on screen or a sound effect. People's attention spans are lower than ever, so you need to get them hooked!

In the editing process, how did you make the science interesting?

- That was definitely one of the hardest challenges, along with writing the script. I usually decide how to make a video and its info more interesting through editing in my narrative films, but in the case of this video, I had already done most of that in the writing, which was a weirder process for me. During editing I mainly tried to make the video not stay on a subject or shot too long or else I would get bored (along with the audience). I also changed the music frequently for each new topic or sequence in the video to make it feel more fresh.

When you watch videos about health information - what works and what doesn't?

- Like I said earlier, I think some of the Vox or science videos that focus solely on science aspects for a really long time can get boring, even if it's a subject I am interested in. I think having motion graphics combined with an actual person talking to the camera or testing something out in real life makes the video a lot more relatable and easier to watch. It feels human and not just like a computer made it.

- Health videos need a hook because the videomaker has only three seconds to catch someone's attention.

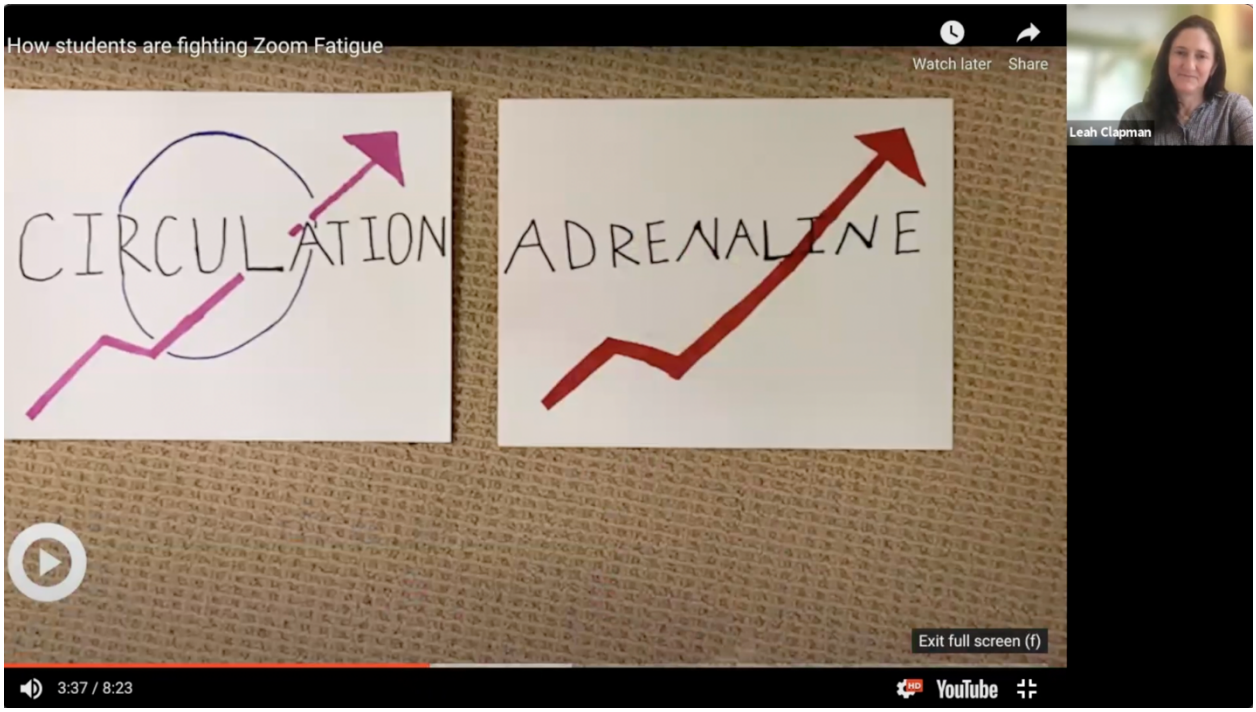
How can educators incorporate this kind of self-directed learning into other classes?

- I am not just saying this because I made this video… this research and video process is extremely useful, and I haven't learned as much from school in the past few months as I did during this video making process. What I mean by that is that this process reinforces the idea of synthesizing information in such a crazy way. I am not a science person AT ALL and I somehow had to have the complex science explanations make sense to me before I could explain it to everyone else, and that's an extremely useful skill for life. Additionally, learning how to cut down hours of footage and make a cohesive story through sound bites can be difficult the first few times that you do it. Although this wasn't my first video that included this process, the fact that I was reinforcing my editing skills has made me a lot more productive which will be useful for future projects.
- Include filmmaking as an option for projects. For example, my English teacher this year had a variety of project options, including creating a movie.

What is your advice to program leaders who want to encourage students to make videos?

- Don't make it feel like a chore, if that makes sense? I think I would have the first video be about whatever the student wants. If that's too broad it could just be a video that has them introduce themselves and their hobbies and what they like, perhaps for the first day of class. Throughout all of my schooling years, I had no problems making a video for class, because I was already interested in filmmaking. BUT, it was much harder sometimes to focus on that video if it felt like an assignment or something that needed to be "boring" or traditionally formal/or educational. What I'm trying to say is that if a student who has never had experience in film had an assignment about explaining a complex topic, they would immediately feel turned off and stressed about the project. So, make it fun and informal at first so they can learn how to shoot and edit! That would be my advice.
- Having the equipment can be very encouraging. If schools are able to, they should have funding for film equipment that the students can borrow. It definitely encouraged me because I was excited to play around with new gadgets and develop my filmmaking skills.


John Barnes


How students are fighting Zoom Fatigue
Watch later
Share
CIRCULATION
ADRENALINE
Leah Clapman
Exit full screen (f)
3:37 / 8:23
YouTube

Participants:

Jena Barchas-Lichtenstein, Knology
Holly Brown, Walter Reed Army Institute of Research
Rebecca Carter, Seattle Children's Research Institute
Alexander Chang, Seattle Children's Research Institute
Michelle Domecki, University of Chicago
Dina Drits-Esser, University of Utah
Michelle Ezeoke, Georgia State University
Ivan Lamas-Sanchez, University of Maryland Baltimore
Lisa Marriott, Oregon Health & Science University
Katherine McMillan-Culp, New York Hall of Science
Julia Miller, Children's National Hospital
Andrea Panagakis, Salish Kootenai College
Patti Parson, PBS Newshour
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
Marisa Pedulla, Montana Technological University
Carlos Penilla, University of California San Francisco
Teresa Schiff, University of Hawaii
Harmony Starr, University of Utah
Jen Taylor, University of Utah

Concurrent Breakout Sessions

Monday, May 24, 2021 – 2:00 PM – 3:00 PM

Evaluator Networking Session 1 – New SEPA Meet and Greet

FACILITATOR:
ALANA NEWELL, PHD, ASSISTANT PROFESSOR, BAYLOR COLLEGE OF MEDICINE

In this informal session, participants first introduced themselves, described their SEPA and their role in evaluation. Conversation was then opened for questions related to evaluation, specifically for new SEPAs, but also for other evaluators. Discussions covered approaches to longitudinal data collection (using Constant Contact marketing services was suggested), use of pre-/post- versus retrospective instruments, adaptations made for COVID and aspects that may be maintained once in-person instruction resumes. IRB issues with different platforms for transcription were also discussed. We also created an email contact list for evaluators, and those interested in evaluation, to keep in touch.

Themed Session: Research Experiences

Monday, May 24, 2021 – 3:00 PM – 4:20 PM

Lessons Learned from Developing a Distance Research Program

PRESENTERS:
TERESA SCHIFF, MD, CIRCLE PROGRAM DIRECTOR; ASSISTANT PROFESSOR, UNIVERSITY OF HAWAII
MZIYA SARISHVILI, BA, CIRCLE RESEARCH COORDINATOR, AREA HEALTH EDUCATION CENTER AT UNIVERSITY OF HAWAII/JOHN A. BURNS SCHOOL OF MEDICINE
KELLEY WITHY, MD, PHD, CIRCLE PRINCIPAL INVESTIGATOR; PROFESSOR; DIRECTOR, HAWAII/PACIFIC BASIN AREA HEALTH EDUCATION CENTER, UNIVERSITY OF HAWAII/JOHN A. BURNS SCHOOL OF MEDICINE

Research is an essential component of career pathways to health and STEAM professions, however, research opportunities are often challenging to find, particularly for high school students. In response, the Hawaii Pacific Basin AHEC launched the Consortium for Increasing Research and Collaborative Learning Experiences (CIRCLE) SEPA program in 2020, which provides distance research with PIs from around the United States for students in Hawaii and the Pacific. Our program also aims to expand public knowledge of research and STEAM career pathways to ensure a large and diverse workforce in the Pacific region.

The CIRCLE program gives students the opportunity to explore a scientific topic of interest to them ranging from foundational sciences to environmental sciences and public health. Throughout the course of a year, they learn how to read and understand scientific literature, collect and analyze data, collaborate with peers, mentors, and PIs, and to present their findings in a formal scientific presentation, which can then be used to present at conferences or other meetings. Each project has at least one near-peer mentor to meet one-on-one to assist participants with understanding the course content and offer guidance for college preparation, career planning, and creation of their resumes, all while helping participants build self-confidence and self-efficacy as they grow throughout the course of the program year.

In grant year one, we launched five remote projects with distance PIs resulting in 45 students successfully completing their projects and 23 of them presenting a poster within their small groups. Four of these students were invited to present their posters at the Association for Clinical and Translational Science Conference held in April 2021 as part of the conference's student Ambassadors Program. Despite the many successes in our pilot year, our analysis of the 2020 evaluation data revealed four main areas of improvement: retention of students, lack of clarity of

expectations (requirements, structures, timeline for each individual project), recruitment of additional PIs, and structured mentorship.

To address these areas requiring improvement, we proposed a three-phase structure for the 2021 grant year with meetings 1-2 times per month in the Spring (Phase I) to get know each other and become familiar with their scientific topics. Phase II will be their research intensive period, given that most students will be out of school at this time. During Phase II students will have weekly check ins with their mentors or PIs and will complete their data collection and analysis. They will finish Phase III in the Fall with preparing and delivering poster presentations to their small groups. In grant year two we also added a structured mentorship program as described above and we clarified requirements of participation. Currently, we are in the second year of the CIRCLE grant. This year we added another five research projects with new PIs from across the country. We have recruited 125 students who are actively involved in the projects.

Remote Mentored Problem-Based Research

PRESENTERS:
PETER FALETRA, PHD, EXECUTIVE DIRECTOR, NEW HAMPSHIRE ACADEMY OF SCIENCE
ALYSON MICHAEL, BS, ASSOCIATE SCIENTIST, NEW HAMPSHIRE ACADEMY OF SCIENCE

Our presentation, regarding our SEPA Learning Science Through Research (LSTR), focused on how we responded to the COVID-19 pandemic. We began with an introduction of our New Hampshire Academy of Science (NHAS) mission of offering secondary school students opportunities to become involved in long-term research with close-mentoring from adults and near-peers. We reviewed how we have established satellite labs and how these labs worked with us through the pandemic to continue our outreach programs. We showed the various research platforms that students used before the pandemic such as *C. elegans* research, molecular biology research, machine learning, and engineering projects. We explained how we added the new research areas of surface water quality analysis and protein modeling that were well-suited to the remote world while still under the expertise of our instructors. We then expressed how we pivoted to offering research done remotely and how we needed to arrange to provide research-grade equipment to the students. We showed that our programs were fully enrolled, all students engaged with the remote programming, and we operated at a level that met our capacity. We presented results from internal evaluations showing that 26 students published abstracts with the American Association for the Advancement of Science annual meeting (held remotely). Our external evaluation found that, although the program was well-received by students, who considered it a positive experience, and that they generally identified their work as similar to that of professional scientists, the students missed the in-person social element of working on-site. We concluded with how we will use this experience to inform the summer 2021 hybrid model and offer more remote work in the coming years.

Developing Partnerships for Epidemiology Education in the Secondary Setting

PRESENTERS:
ROBIN TAYLOR WILSON, PHD, ASSOCIATE PROFESSOR OF EPIDEMIOLOGY & BIOSTATISTICS, TEMPLE UNIVERSITY
DIRK SWART, MA, CEO, ZYNECT LLC
TERRI O'NEIL, MED, SCIENCE AND HEALTH PATHWAY CHAIR, MIDDLETOWN AREA HIGH SCHOOL

We discussed our research experiences with the Technology Linked Epidemiology Education Network, also referred to as TEEN. The NIH SBIR funding has provided us with an important opportunity to scale up delivery of an in-person hypothesis-driven project-based learning curriculum in high schools via a blended learning platform. This blended learning platform known as "Thinkdemic" is being used by the Technology-Linked Epidemiology Education Network of University and high school educators in partnership with Zynect. The goal of the program is to increase interest and persistence in the sciences through increased scientific self-efficacy. The goal of our session was to increase knowledge of key attributes of synergistic partnerships through a brief presentation and interactive discussion with the audience. Major benefits of collaboration included leaning to be much clearer in all communication, with a benefit of greater confidence in communication across audience types. Working with this project has increased the intentionality of teaching and increased educator efficacy in project-based learning. Having templates to guide students—especially during Covid and in the online setting was especially useful. Having 80 percent of students express in our first pilot report that the disease transmission knowledge gained was the most important thing about the program was very rewarding. Major challenges to look out for included: Being in the midst of the Covid-19 pandemic has been a major challenge in terms of navigating our pilot testing. School cancellations led this to be online which meant that students were not in the classroom and thus, were significantly less likely to participate. Specific challenges of working across university, high school, corporate institutions include the completely different work environments—e.g., product driven, student-driven, versus research-driven. The cultures, work patterns and major objectives of each of our partner institutions are different and we had to learn to acknowledge, account for and embrace these differences. Major challenges for facilitators to overcome included: the funding itself; university accreditation policies including the requirement to include career-development activities, especially among minority and underserved populations; and knowing the basics of Team Science—simply knowing the "Team Cycle" and how to reach the "performing" stage of the cycle was beneficial to overcoming obstacles during the project. Audience interaction emphasized the need for facilitators to provide capstone experiences for program success even in the online setting.

Funding Opportunity: NIDDK Short-Term Research Experience Program to Unlock Potential (STEP-UP) (R25)

PRESENTER: ROBERT CLAY RIVERS, PHD, OFFICE OF MINORITY HEALTH RESEARCH COORDINATION, NATIONAL INSTITUTE OF DIABETES AND DIGESTIVE AND KIDNEY DISEASES (NIDDK), NIH

This short presentation by Dr. Rob Rivers focused on a recently released funding opportunity from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), RFA-DK-21-023. The over-arching goal of the NIDDK R25 program is to support educational activities that enhance the diversity of the biomedical, behavioral, and clinical research workforce. The aptly entitled Short-Term Research Experience to Unlock Potential (STEP-UP) provides funding to research institutions to provide a national summer research experience program for both high school and undergraduate students for eight to 10 weeks. STEP-UP seeks to facilitate exposure opportunities for students from diverse backgrounds, including students from groups underrepresented in biomedical research on a national basis, such as individuals from disadvantaged backgrounds, individuals from underrepresented racial and ethnic groups, and individuals with disabilities. Dr. Rivers provided an overview of the program in the past and the program's goals in the future as part of the current funding opportunity announcement. In addition, there was a lively dialog and question and answer session related to the announcement and the importance of research experiences early in the academic development of students.

Participants:

Maria Alvarez, El Paso Community College
Carmela Amato-Wierda, University of New Hampshire
Robin Bartlett, University of Alabama
Renee Boney-Jett, University of Minnesota
Asa Bradman, University of California Merced
Katherine Bruna, Iowa State University
Desmond Campbell, Vanderbilt University
Donna Cassidy-Hanley, Cornell University
Ellen Chenoweth, University of Alaska Southeast
Ido Davidesco, University of Connecticut
Jane Disney, MDI Biological Laboratory
Janet Donaldson, University of Southern Mississippi
Dina Drits-Esser, University of Utah
Levent Dumenci, Temple University
Sara Erickson, Iowa State University
Lynn Foster-Johnson, Dartmouth College
Katharina Furrs, University of Maryland, Baltimore
Maurice Godfrey, University of Nebraska Medical Center
Ben Gorski, University of Maryland Baltimore
Ben Greenfield, University of Southern Maine
Mary Kay Hickey, Cornell University
Berri Jacque, Tufts University
Larry Johnson, Texas A&M University
Mary Jo Koroly, University of Florida
Stephen Koury, University at Buffalo
Summer Kuhn, West Virginia University
Julie Lucero, University of Nevada, Reno
Neil Lamb, HudsonAlpha Institute for Biotechnology
Mary Larson, Salish Kootenai College
Lisa Marriott, Oregon Health & Science University

Julia McQuillan, University of Nebraska – Lincoln
Jasmina Mesic, FoodMASTER
Daniel Meyer, Northwestern University
Brittany Michel, Dana-Farber/Harvard Cancer Center
David Micklos, Cold Spring Harbor Laboratory
Mia Minen, University of Tennessee, Knoxville
Osvaldo Morera, University of Texas, El Paso
Bruce Nash, Cold Spring Harbor Laboratory
Elizabeth Ozer, University of California San Francisco
Elizabeth Parker, University of Maryland, Baltimore
Marisa Pedulla, Montana Technological University
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
Rachel Perovsek, Case Western Reserve University
David Petering, University of Wisconsin-Milwaukee
Birmingham
Kevin Phelan, University of Arkansas for Medical Sciences
Misty Pocwierz-Gaines, University of Nebraska Medical Center
Sarah Praskievicz, The University of North Carolina at Greensboro
Rob Rockhold, University of Mississippi
Dara Ruiz-Whalen, eCLOSE Institute
Alexandra Ruth, Temple University
Rebecca Smith, University of California – San Francisco
Gwendolyn Stovall, University of Texas at Austin
Janice Straley, University of Alaska Southeast
Allison Stranick, Temple University
Abbey Thompson, The Tech
Dave Vannier, Fred Hutch Cancer Research Center
Robin Wilson, Temple University
Kelley Withy, University of Hawai'i at Manoa
Kristine Wylie, Washington University
J. Michael Wyss, University of Alabama at

Themed Session: Multimedia, Social Media, Virtual Learning

Monday, May 24, 2021 – 3:00 PM – 4:20 PM

Like, Follow, Share, Subscribe: How to Use Social Media in SciEd

PRESENTERS:

AMY WARREN, PHD, NSF GRANT DIRECTOR, NORTHWEST ARKANSAS COMMUNITY COLLEGE

KIMBERLY JACOBY MORRIS, PHD, EDUCATION SPECIALIST, EDUCATION AND COMMUNITY INVOLVEMENT BRANCH, NATIONAL HUMAN GENOME RESEARCH INSTITUTE

Social media has become a powerful means of communication, especially among the younger generations who are the main target of SEPA funded projects. In this session, presenters discussed a variety of social media platforms that are available and explored different ways they can be integrated into programs to highlight and strengthen STEM outreach efforts. The presenters have successfully used social media for content delivery, student/teacher/public engagement, and for outreach administration, in addition to the more traditional marketing approaches. During the session, presenters highlighted three specific programs where social media was the primary form of communication: virtual engineering summer camps, new program development, and an interactive awareness campaign. They also provided insights into the use of multiple social media platforms to meet various objectives and reach diverse audiences.

The question-and-answer portion of our session was highly participatory. With four minutes for questions, three were answered live and the remaining four were addressed in the Zoom Chat. Attendees were interested to learn more about best practices to engage parents or guardians on social media. Kim provided an example where a student feature with a picture and a quote has been used by NHGRI with success (families reshare content on their personal pages with pride). Organizations must work with parents for approval prior to posting. Amy provided additional considerations that need to be accounted for when working with students' accounts, like privacy and safety. Attendees were also hoping to learn logistical strategies in creating content e.g., word count goals, graphics, frequency of posts. Travis Kelleher provided contact information to build coalition between the NIH SEPA accounts/newsletter and SEPA awardees for project features. Their email address Is takelleh@bcm.edu.

Adapting & Pivoting: Using our Lessons Learned as an Opportunity

PRESENTER:
MICHELLE EZEOKE, PHD, PROGRAM MANAGER, BIO-BUS PROGRAM, GEORGIA STATE UNIVERSITY

One year ago, the K-12 community was trying to find a way to manage distance learning during the pandemic. Many schools did not have the appropriate resources for students and if they did have resources, the K-12 students didn't have the appropriate tools at home to benefit from the resources provided. This also greatly affected many of the hands-on and in-person SEPA projects like "DNA Runs in the Family" at Georgia State University's Bio-Bus Program.

The Pew Research Center published an article at the beginning of the pandemic where they recognized the ever increasing "homework gap". Some of their key findings were the following:

- The majority of eighth-grade students in the United States rely on the internet at home to get their homework done
- The "homework gap" – which refers to school-age children lacking the connectivity they need to complete schoolwork at home – is more pronounced for black, Hispanic, and lower-income households.
- Some lower-income teens say they lack resources to complete schoolwork at home.

During this presentation we also discussed the "Summer Slide" phenomenon according to an article published by Brookings:

The summer slide is a phenomenon in which students' academic skills regress over the summer and after the pandemic this has only lengthened to include the months of March, April, and May.

Researchers have suggested that the summer slide is most often found in students from underrepresented populations who do not have access to technology or the internet. On average, students' achievement scores declined over summer vacation by one month's worth of school-year learning. Declines were sharper for math than for reading, and the extent of loss was larger at higher grade levels. Importantly, they also concluded that income-based reading gaps grew over the summer, given that middle class students tended to show improvement in reading skills while lower-income students tended to experience loss.

We concluded the session with examples of challenges that different SEPA projects faced and how they utilized these challenges to create opportunities.

AMA (Ask Me Anything) with Interactive Multimedia Experts

Facilitator:

Adam Hott, PhD, Digital Application Lead, HudsonAlpha Institute for Biotechnology

Panelists:

Peter Anderson, BFA, Creative Director, Genetic Science Learning Center, University of Utah

Andrij Holian, PhD, Director, Center for Environmental Health Sciences, University of Montana

Paulette Jones, MRE, President and CEO, Meadowlark Science and Education LLC

Harmony Starr, BS, Senior Media Production Manager, Genetic Science Learning Center, University of Utah

The purpose of this session was to provide attendees the opportunity to ask a group of experts about using and/or developing interactive multimedia products. Each presenter briefly introduced themself and then the session was opened to questions from the attendees. Questions on what makes a successful interactive multimedia project and how to get started kicked off the discussion. Each presenter also shared their perspective on the process to completion and their thoughts on how to build products to reach the largest audience. Each invited expert also provided his/her perspective on what platform and what type of interactive multimedia is best suited to today's student and current educational systems. Finally, a discussion of how the COVID-19 pandemic affected the use of interactive multimedia rounded off the session.

Participants:

Deanna Buckley, University of Texas at Austin
Luke Bradley, University of Kentucky
Asa Bradman, University of California Merced
Liliana Bronner, University of Nebraska Medical Center
Rebecca Carter, Seattle Children's Research Institute
Michael Carvan, University of Wisconsin-Milwaukee
Victoria Coats, Oregon Museum of Science & Industry
Clayton Coffman, Vanderbilt University
Jamie Cornish, Montana State University
Behrous Davani, NIH/NIGMS
Ido Davidesco, University of Connecticut
Jasmine Donkoh, Colorado State University
Dina Drits-Esser, University of Utah
Melani Duffrin, Northern Illinois University
Brittney Edwards, University of Texas MD Anderson Cancer Center
Martina Efeyini, University of Maryland, Baltimore
Jenica Finnegan, University of Nevada, Reno
Adrianne Fisch, Purdue University
Lynn Foster-Johnson, Dartmouth College
Katharina Furrs, University of Maryland, Baltimore
Melinda Gibbons, University of Tennessee, Knoxville
Tyler Gumpel, NYU Langone Health
Tim Herman, Milwaukee School of Engineering

Megan Hochstrasser, University of California, Berkeley
Sheila Homburger, University of Utah
Adam Hott, Hudson, Alpha Institute for Biotechnology
Belen Hurle, NIH/NHGRI
Kim Jacoby-Morris, NIH/NHGRI
Tania Jarosewich, Censeo Group
Larry Johnson, Texas A&M University
Lauren Johnson, Washington University in St. Louis
Brinley Kantorski, Partnerships in Prevention
Travis Kelleher, Baylor College of Medicine
Ivan Lamas-Sanchez, University of Maryland Baltimore
Meghan Leadabrand, University of Nebraska, Lincoln
Atom Lesiak, University of Washington
Kara Lewis, MD Anderson
Dina Markowitz, University of Rochester
Revati Masilamani, Tufts Medical School
Allison McQueen, Tuft University
Julia McQuillan, University of Nebraska – Lincoln
Kauionalani Mead, Hawaii/Pacific Basin Area Health Education Center
Catherine Morton, West Virginia University
Cynthia Nazario-Leary, University of Florida
Patti Parson, PBS Newshour
Carlos Penilla, University of California San Francisco
Robyn Pennella, St. Jude Children's Research Hospital
Carla Romney, Boston University
Dara Ruiz-Whalen, eCLOSE Institute
Patrice Saab, University of Miami
Bonnie Sachatello-Sawyer, Hopa Mountain
Jyoti Singh, NIH/NIGMS
Valerie Solon, Tufts University
Amy Spiegel, University of Nebraska – Lincoln
Louisa Stark, University of Utah
Ailea Stites, University of Chicago
Jen Taylor, University of Utah
Debra Tyrrell, Wheeling Jesuit University
Michele Ward, Texas A&M University
Anne Westbrook, BSCS Science Learning
Sarah Will, Partnerships in Prevention
Charles Wood, Wheeling University

Themed Session: Broadening Participation in Evaluation (plus an NGSS assessment bonus)

Monday, May 24, 2021 – 3:00 PM – 4:20 PM

Re-engaging Program Alumni Through Focus Groups to Inform Program Evaluation

PRESENTERS:
SARAH WOJISKI, PHD, DIRECTOR OF EDUCATION AND EXTERNAL PROGRAMS, THE JACKSON LABORATORY
CHARLIE WRAY, PHD, VP FOR EDUCATION, THE JACKSON LABORATORY
EMALY PIECUCH, PHD, GENOMICS EDUCATOR, THE JACKSON LABORATORY

This team shared their genomics focused curriculum development work that has been ongoing since 2015. In 2019 they began an evaluation initiative focused on program improvement asking the questions: "How are we doing?" and "Can we do better?" This evaluation work was focused on curriculum use drawing from the experiences and perceptions of short course participants and alumni who are teachers trained to use the curriculum. From current short course participants, they wanted to understand what their motivations and barriers to curriculum use are. From past participants, they wanted to understand how teachers were using the curriculum in practice and what they had learned while implementing it. To get this information, they conducted focus groups with teacher participants past and present.

The zoom attendees then engaged in a brief discussion about how others had engaged program alumni in evaluation activities. Many had described creating engagement opportunities through follow up events and programs designed for alumni or for alumni and current participants. These opportunities are key to keep alumni engaged and available for evaluation participation.

The team shared that their evaluation findings indicated that time is the biggest barrier to using the curriculum. Teachers have constraints on "extra" content they can fit into their classroom time. Bioinformatics was the first content to be eliminated or modified if teachers ran short on instructional time.

The program team responded to these findings by creating more entry-level lessons around bioinformatics that can be used in shorter time frames and to address more universal learning standards or goals.

Teachers mentioned they were motivated by resources and materials access, and that they were often overwhelmed during the short training course.

The team responded by creating more supplemental materials and lessons based on existing content, rather than new material based on new content areas. They created detailed curriculum guides and peer-teaching to better scaffold teacher learning during and after the short course. They also eliminated some content from the short course to build in time for teacher reflection and processing.

Creating Collective Impact – Activated Partnerships x Community Co-creation

PRESENTER:
HOLLY TRUITT, MS, PRINCIPAL INVESTIGATOR, OWNER, EDUCATOR, CITY OF MISSOULA, HOLLY TRUITT CONSULTING, STANFORD SCHOOL

The LINK in Missoula, MT is a new community library and culture house that will become the nexus for STEM training in the Missoula community. Holly described for us how she uses collaborative design techniques to conduct planning evaluation/needs assessment for this STEM education community hub.

Communities are multi-faceted; partnerships need to engage community to co-design programs for improvement and development. Sometimes issues that need to be addressed are hidden—not top of mind.

Needs assessment/co-design with community involves asking and answering questions together. Holly uses the following questions: "What does our community need in its garden?" "Who are our master gardeners?" "What does the garden look like?" and "How do you evaluate the health and impact of your garden?"

These questions serve as the basis of design labs used for "listening" to the community. Design labs with families and high schoolers drastically changed the design for the LINK. COVID-19 forced her to conduct design labs with afterschool programs online using collaborative software such as padlet. These online efforts were still effective—moving the design more toward a play focus. Design labs with tribal communities emphasized that language and culture must be visible in the design. To be successful design labs need to be mindful of the culture and heritage of the participants—design prompts are not necessarily universal. Holly emphasized that reaching outside our own sector to create partnerships that are diverse is the key to successful co-design.

Exploring Program Impacts Across All Stakeholders: University Student Mentors Describe the Personal and Professional Benefits of their Community Service Through Post-Lesson Reflective Diaries

Presenters:
Lindley McDavid, PhD, Senior Evaluation and Research Associate, Purdue University
Loran Carleton Parker, PhD, Associate Director and Senior Evaluation Associate, Purdue University
Weiling Li, PhD, Evaluation and Research Associate, Purdue University
Sandra San Miguel, DVM, PhD, Associate Dean for Engagement Professor, Purdue University

How We Role is an afterschool and summer program that delivers fun science and math experiences to young children from underserved and diverse backgrounds. Each lesson is scheduled to last about 20-30 minutes and is led by a trained role model. The evaluation focuses on the content, delivery, and outcomes of youth participation. They also collect lesson fidelity and feedback information from those who lead the curriculum and collect qualitative data about the relevance and meaningfulness of the program from the perspective of community center partners and even the families of youth. They have also conducted Role model focus groups to understand their experiences and how they can improve the program from their perspective.

Attendees shared that they also include other groups of stakeholders in evaluation including families, community groups and external advisory board members.

In their evaluation, they identified the student role models as stakeholder groups where they could be missing some important outcomes and impacts. They learned after conducting program feedback focus groups with the role models that there were some unintended impacts and benefits occurring for this group. Therefore, they proceeded with collecting more data to further explore their experiences including more focus groups, surveys, and pre-and post-visit diary entries.

During focus groups, they learned that the students appreciated the bit of the program where they answered a question about their life, their experience as a student and more. They shared that it gave them an opportunity to think about their journey, so they wanted to provide opportunities to purposefully share those reflections with this group.

Students shared that they were eager, but often nervous, about leading lessons at the local community partner site with young children. They expected to have a positive impact on students as role models and they anticipated they would experience some personal gains as well. Students

also communicated the value of the program to them personally, and for the college and community. Over the course of the program, students wrote about how their program experiences would have a long-term impact on their personal and professional lives. They discussed how the program supported their well-being and growth as a student and fostered their academic skills.

Students also shared that their interactions with community children and leaders, faculty, and their peers inspired them to align their community service with their professional goals. Many students communicated their desire to implement a similar program in their future practice. Comments were overwhelmingly positive and encouraged more students and programs to integrate similar programs to support the well-being of students, visibility of colleges, and to support the community impact of the profession.

Over time, they learned about the potential reciprocal effects of the program for the role models. Specifically, the diary entries demonstrate that role models experience growth in academic and professional skills, and personal well-being. These benefits indicate that programs like theirs could serve as an opportunity for veterinary colleges to not only serve the community but also develop a curriculum focused on developing soft-skills vital to students' successful interactions with clients and support of animal health. Students also discussed that the program offered a needed break from stressful academic pursuits. The program offered a pathway for them to step away from campus, connect to life outside of school, and be reminded of their families and home communities. Students also experienced a renewed passion for their studies as the joy and enthusiasm of young children reminded them of why they initially pursued the program.

Students shared that they realize continuing community service in their professional careers would yield similar benefits –decreasing stress and improving connections with their community.

Attendees shared that NCI YES also found mentors personally benefited from participation in the program. Other programs mentioned that their content reviewers benefited as well because their role in the program raised their community status so that they were viewed as"experts."

Developing and Validating a 3D, Phenomenon-Based Item Cluster for an NGSS friendly Cell Biology Unit

PRESENTERS:
ANN LAMBERT, PHD, RESEARCH ASSOCIATE, GENETIC SCIENCE LEARNING CENTER, UNIVERSITY OF UTAH
DINA DRITS-ESSER, PHD, ASSISTANT DIRECTOR FOR RESEARCH AND EVALUATION, GENETIC SCIENCE LEARNING CENTER, UNIVERSITY OF UTAH

The project aimed to create an NGSS-friendly, phenomenon-based assessment that is "3D" and elicits three dimensions of learning. Because of the need to be 3D, item types are very complex, making the validation of the assessment difficult along traditional item-cluster approaches.

Traditionally, clusters must be based on the same stimulus, interrelated and interdependent and must cover two or three dimensions.

The current assessment tool is created in the style of an interactive narrative in which students follow along as a scientist investigates an amphibian pandemic and attempts to solve its pathogen. Assessment questions are interspersed throughout the narrative and relate directly to the scientist's actions, practices, and knowledge.

The assessment items are all multiple-choice due to the program's desire to quickly quantify student level of "correctness." The team identified several drawbacks to this multiple-choice design including the undue influence of distractors on student learning. They attempted to counter this by providing feedback on each item immediately after students submit their answer and by reducing the number of possible answer choices.

Students field tested items and reported that they enjoyed taking the assessment, however, some struggled with the large amount of reading required to complete it. This could be due to reading level OR information processing overload.

The team sought feedback from the attendees about how to validate this assessment. One attendee suggested assessing item pairs or triads, rather than individual items, or foregoing construct creation since the NGSS emphasizes integration of concepts.

Participants:

Alison Allen, Rockman Et Al
Craig Berg, University of Wisconsin-Milwaukee
Julie Bokor, University of Florida
Holly Brown, US Army Medical Research and Materiel Command
Manetta Calinger, Wheeling Jesuit University
Desmond Campbell, Vanderbilt University
Rochelle Cassells, University of Utah

Christina Chhin, Institute of Education Sciences/US Dept of Education
Jeanne Chowning, Fred Hutchinson Cancer Research Center
Behrous Davani, NIH/NIGMS
Martina Efeyini, University of Maryland, Baltimore
Katharina Furrs, University of Maryland, Baltimore
Marnie Gelbart, Harvard Medical School
Ella Greene-Moton, University of Michigan
Joan Griswold, University of Washington
Dana Haine, University of North Carolina at Chapel Hill
Megan Hochstrasser, University of California, Berkeley
David Holben, University of Mississippi
Adam Hott, Hudson, Alpha Institute for Biotechnology
Regina Idoate, University of Nebraska Medical Center
Tania Jarosewich, Censeo Group
Candice Johnson, Southern Illinois University Edwardsville
Megan Keniry, The University of Texas Rio Grande Valley
Mary Larson, Salish Kootenai College
Lisa Marriott, Oregon Health & Science University
Kauionalani Mead, Hawaii/Pacific Basin Area Health Education Center
Sandra San Miguel, Purdue University
Megan Morrone, Rockman Et Al
Cecilia Nguyen, Oregon Museum of Science and Industry
Carlos Penilla, University of California San Francisco
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
Kelli Qua, Walter Reed Army Institute of Research
Carla Romney, Boston University
Anja Scholze, The Tech
Louisa Stark, University of Utah
Shelley Stromholt, Aspect Research + Evaluation
Brittany Swift
Laura Tenenbaum
Debra Tyrrell, Wheeling Jesuit University
Sarah Will, Partnerships in Prevention
J. Michael Wyss, University of Alabama at Birmingham
Debra Yourick, Walter Reed Army Institute of Research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Khulan Erdenedalai

Plenary Session: Update on the SEPA Program and Town Hall

Tuesday, May 25, 2021 – 11:00 AM – 12:00 PM

Plenary Session: Update on the SEPA Program and Town Hall

TONY BECK, PHD, PROGRAM DIRECTOR, SCIENCE EDUCATION PARTNERSHIP AWARD (SEPA), DIVISION FOR RESEARCH CAPACITY BUILDING, NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES (NIGMS), NIH

Dr. Beck expressed his appreciation for the quality of Monday's session. He also thanked Dr. Stark and her team for their work to organize the meeting, as well as acknowledging the contributions of plenary speakers, session coordinators, presenters, attendees and NIGMS for sponsorship of the meeting and support of the SEPA program.

Dr. Beck described the evolution of the SEPA program (1991-2021) and discussed the program's history.

- 1991 SEPA program established at NCRR
- 1993 first SEPA project with IDeA
- 2000 SEPA was moved to DCRR
- 2011 OSE/SEPA was moved to Office of the NIH Director
- 2013 Consolidation of federal science education programs by OMB; SEPA program potentially placed on hold along with other NIH science education programs
- 2017 SEPA program moved to NIGMS; SEPA included in federal budget

He also discussed the continuum of programs to enhance diversity at NIGMS and described how SEPA fits with this set of training and education programs from K–12 through postgraduate and advanced scientific training.

Dr. Beck described how access to STEM opportunities in low research-intensive states has grown over time. In 2001, there were few IDeA States with SEPA projects. This number increased to 12 in 2016 and 19 in 2020. In 2021, there will be six new projects in IDeA States. He presented an overall map of SEPA projects by state.

He presented and described areas of future interest for SEPA projects.

- Data science, computational and quantitative skills
- Partnerships with other NIGHS programs, NARCH, RISE, Mark etc. (programs focused on skill building for a scientifically literate workforce)

- Partnership with MIDAS and other professional organizations
- Incorporating real world data sets into SEPA projects, as from *All of Us*, MIDAS, N3C, etc.
- Quantitative and qualitative data on the outcomes of SEPA programs, including rigorous evaluation plans and research strategies.

Dr. Beck also led a Town Hall discussion of the following topics.

- SEPA pre-submission webinar on June 9, 1–3 pm EDT
- Importance of attention to Human Subjects Research considerations
- Budget issues
- What happens inside a review panel meeting

SEPA.org website: importance of projects providing updates on their landing pages

- Point of contact for the website is Travis Kelleher, takelleh@bcm.edu
- Form available for new awardees to fill out that helps with creation of their project pages
- Pages can be updated by grantees as needed

SEPA big picture database provides information to NIH and other federal entities related to overall scope and contributions of SEPA programs overall

- Grades, topics addressed, audience, etc.
- Will be completed annually at the time of preparing the annual progress report
- Database will be housed on the SEPA website

SEPA related publications

- Projects should be certain to report publications related to their SEPA work
- COVID related resources, websites, and publications

Topic-specific working groups

- There have been a number of working groups: remote learning, STEM games, citizen science, bioinformatics, environmental health, genomics and ethics, early learners, informal science education, etc.

Several topics were discussed during the open discussion (Town Hall). Questions and a summary of the responses appears below.

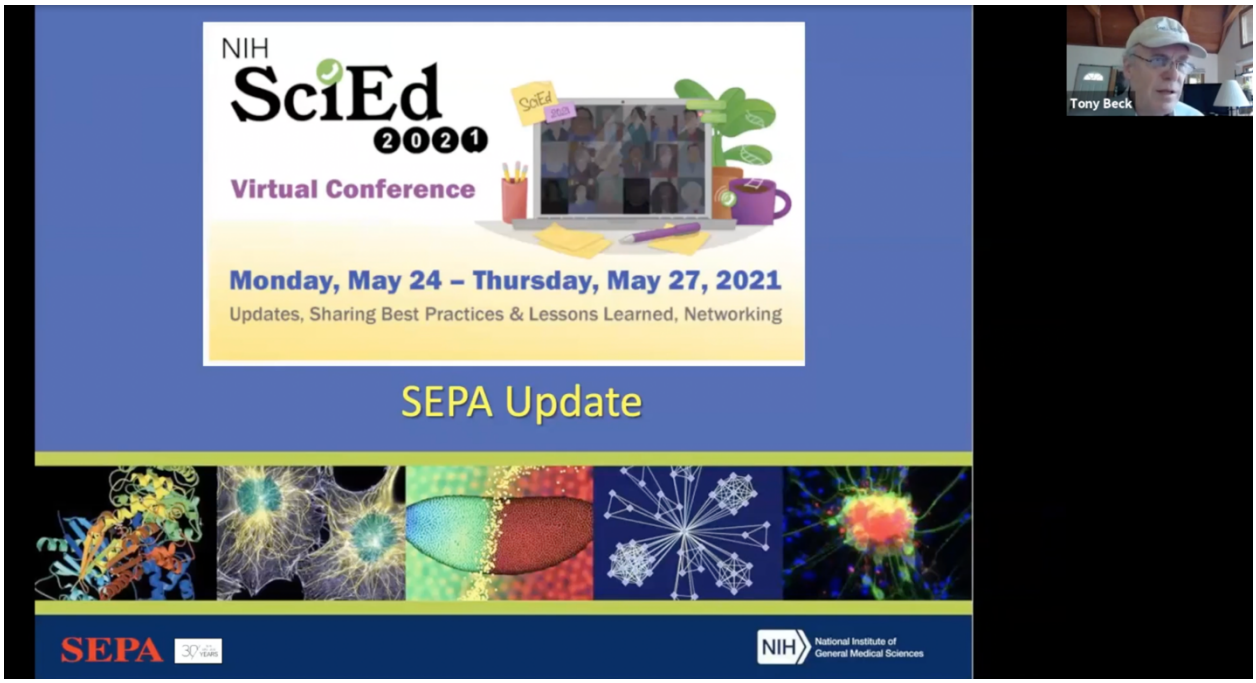
- *My question is on connections to INBREs vs COBREs. INBREs seem a better target, but there are more COBREs to partner with. Do you think COBREs might be a good source for partnership and incorporating real world data sets?* INBRE provides support for faculty and students, COBRE provides infrastructure support. SEPA leads to a natural connection to INBRE sites because the

students might come from the same communities. INBRE students can learn mentoring skills, etc. There often are connections with COBRE institutions as well, because of the areas in which investigators are working. Each INBRE and COBRE entity is focused on a different area of science, sometimes there are connections based on the science and student groups, depending on the location.

- *Do we know if NIGMS is interested in partnerships with other federal agencies, specifically, I'm working on a computational thinking project with NSF. There could be good synergy with SEPA activities. Any concerns or benefits to this sort of thing?* All agencies are working on these ideas, and there is communication and synergies across the agencies. Programmatically, projects that propose an interaction with another agency would be a positive development.
- *Can you clarify the number of awards that you think will be made in 2021?* It is not yet possible to predict this number.
- *Would it be possible to add a place on the SEPA webpage where a repository of evaluation instruments could live and be shared among SEPA projects?* An evaluation section already exists on the SEPA website. Additional contributions are welcomed.
- *Can you explain more about working groups? Do these groups meet regularly throughout the year? Does each have a leader?* The groups are ad hoc. A diabetes education group was quite active for a period of time due to common interests. The groups can be based on interests of group and project members. The groups help people get to know one another, which has been challenging in the current environment. It is an educational maker movement. Individuals should email Dr. Beck about their areas of interest; he will assist in connecting the groups and finding group leaders. A vaccine hesitancy working group also was suggested. Potential working groups:
    - Advances in remote learning technologies
    - Serious STEM games
    - VR, AI and other emerging technologies for learning
    - Citizen Science and Crowdsourcing
    - Data science and bioinformatics
    - Early learners
    - SEPA partnerships with IDeA and TWD programs
    - Environment, health and social justice
    - Genomics and ethical issues
    - Infectious disease and epidemiology
    - Informal Science Education (ISE)

- *Will health misinformation be a priority for SEPA future funding?* Education aimed at the general public is an aim of the SEPA program. Vaccine hesitancy and other issues related to the COVID-19 pandemic have demonstrated lack of public understanding of science.

- *As we have all had to pivot to virtual programming, we have had the benefit of being able to reach underrepresented students beyond our own back yard. What are SEPA's thoughts on virtual or hybrid programming going forward post-COVID?* Anything that you can do to get interesting, exciting resources out to students is encouraged. There are no limits to dissemination.



Plenary Sessions:

Tuesday, May 25, 2021 – 2:00 PM – 3:00 PM

Update on the NCI Youth Enjoy Science Program

ALISON LIN, PHD, DEPUTY CHIEF, DIVERSITY TRAINING BRANCH, CENTER TO REDUCE CANCER HEALTH DISPARITIES, NATIONAL CANCER INSTITUTE (NCI), NIH

NCI Diversity-Focused training programs are both extramural (CURE; 5000+ supported) and intramural (in 2017, iCURE). They are designed to promote and support underrepresented students and scientists. Participants come in at many points along the pipeline and can change goals but need to have a goal to begin with. The program encourages trainees to think about career advancement.

The focus of today's session is on extramural - increasing the talent pool especially on the younger end and emphasizing scientific areas of need so that the cancer research workforce better resembles the population of the US.

The Youth Enjoy Science (YES) program provides supplemental funds for cancer center support. NCI-designated cancer centers develop their own programs to engage underrepresented high school students, using each center's strengths. They must engage, not just expose, the participants. They encourage a two-year commitment, and engagement with the mentor over the school year. Programs are encouraged to have support activities as well as research. The supplement evolved into a R25 funding mechanism so it's not just limited to cancer centers, and expanded the age group to middle school but the goals have stayed the same.

Each application has multiple components - research experience, curriculum, and outreach. Individual mentored research experience is required. Curriculum is centered on creating educational tools for students, both for YES and in general; teachers should have something to bring back to classroom. Outreach is also very important; successful applications must show meaningful participation of families and communities, to help retain/have a higher probability of retaining students.

PIs and teams are encouraged to collaborate and can collaborate with SEPA (a number also have SEPA grants).

Successful applications include:

- Why your YES program is needed, and what can it bring to the communities.
- Must be specific to the application, not just emphasize diversity.

- There should be connections between the components, clear cancer focus, clear and feasible exit strategy for the participants (eventually keeping them in the career path or any successful path).

There isn't a current active FOA, but it's expected this summer (now available: https://grants.nih.gov/grants/guide/rfa-files/RFA-CA-21-020.html). Participants are expected make a two-year commitment. Applicants can select the age level(s) they want to focus on. The project scope should be realistic.

YES Fact Sheet: https://www.cancer.gov/about-nci/organization/crchd/about-health-disparities/resources/yes-r25-fact-sheet.pdf

Supporting Teachers: Building a Pathway to Provide Teacher Access to SEPA Resources

Elizabeth "Beth" Allan, PhD, President, National Science Teaching Association, and Professor of Biology, University of Central Oklahoma

Dr. Beth Allan spoke about NSTA's pilot program with members of the SEPA community, which provides access to high quality curriculum materials. NSTA has been providing digital resources for teachers and webinars on health-related topics such as viruses and vaccines. She's especially proud of the "Daily Do" activities that can be easily included in lessons, are aligned with standards, and have gone through rigorous review.

NSTA is looking for volunteers from SEPA to tag their materials with NSTA tags so they can be shared with a large audience. NSTA will train volunteers on how to tag the materials with teachers' questions and search patterns in mind. Resources can be tagged for content, process, or sensemaking elements (e.g., phenomena, student ideas). It's important to maintain consistency and accuracy across database tags.

During the pilot, NSTA staff will provide feedback to SEPA investigators. As they collaborate and optimize the tagging process, NSTA hopes to provide a similar service to other organizations. Dr. Allan expects that the SEPA pilot will take 6-8 months to complete.

There are other ways to contribute to NSTA's resource database. For instance, researcher Okhee Lee and her team created a "Daily Do." SEPA PIs may wish to do the same.

Questions and Answers

Q: Will NSTA provide resource links that can be shared and tracked?

A: The links will probably appear on the NSTA and SEPA websites. NSTA will be able to provide download data.

Q: Would materials be free to any teachers?

A: There's a free digital membership that provides access to a certain number of materials per month.

Q: Will you consider flipped lessons as well as other formats?

A: Yes, but NSTA will not modify your lessons.

NIEHS Partnerships for Environmental Public Health (PEPH) Program – Synergy with the SEPA Program and SEPA Projects

Liam R. O'Fallon, MS, Health Specialist, Population Health Branch, Division of Extramural Research and Training, National Institute of Environmental Health Sciences (NIEHS), NIH Synergies regarding STEM and community engagement.

The Partnerships for Environmental Public Health Program (PEPH) was established in 2008 as a network of grantees and their partners with a commitment to community engagement to advance and promote environmental public health. Previously, there were not enough conversations taking place across the programs, so a space was created for grantees and stakeholders to come together around common interests. Grantees and stakeholders now have easy access to the materials and tools developed under PEPH. This partnership is not a grant program. It is a network of grant programs that focus on research, educational training, and environmental health disparities.

A framework was established to coordinate and integrate the various new and existing initiatives that involve communities and scientists working together on contemporary issues in Environmental Public Health research. In addition to sharing results from individual research projects, PEPH's goal is to educate participants on topics such as capacity building, evaluation methods, and best practices in community-based research. Materials are created and provided to increase awareness and literacy about environmental health risks. There is a broader sharing of ideas between and among participants than in the past programs. In order to disseminate research-based information from the PEPH program, coordination between grantees, stakeholders, and the NIEHS is necessary.

PEPH website: https://www.niehs.nih.gov/research/supported/translational/peph/index.cfm

Concurrent Breakout Sessions:

Tuesday, May 25, 2021 – 3:00 PM – 4:00 PM

Exploring Synergies Between NSTA and SEPA: A Conversation with Dr. Beth Allan, NSTA President, and Tricia Shelton, NSTA Chief Learning Officer

FACILITATOR:
JEANNE TING CHOWNING, PHD, SENIOR DIRECTOR – SCIENCE EDUCATION, FRED HUTCHINSON CANCER RESEARCH CENTER
PANELISTS:
BETH ALLAN, PHD, PRESIDENT 2020-2021, NATION SCIENCE TEACHING ASSOCIATION
TRISHA SHELTON, MA, NSTA CHIEF LEARNING OFFICER, NATIONAL SCIENCE TEACHING ASSOCIATION

This session followed a plenary talk by Dr. Beth Allan, NSTA President, about the possibilities for collaboration between NSTA and SEPA/SciEd.

This partnership could draw together SEPA/SciEd programs which are looking for dissemination channels, with the National Science Teaching Association (NSTA), which is looking for scientifically accurate teaching/learning content that has been vetted and evaluated.

Following introductions, Tricia Shelton reviewed the range of existing possibilities for SEPA projects to become involved with at NSTA. These include participating in conferences, webinars, writing journal articles, writing for the NSTA press, and being involved in the new Daily Dos. Developing Daily Dos would require additional training by NSTA. Some SEPA PIs have already been involved in creating and sharing content with NSTA. NSTA staff stressed the importance of sharing materials that align with current best practices in science education as identified by science education research (for example, the use of phenomena-based storylines).

We discussed the possibility of having a selected small group of SEPA/SciEd projects pilot "tagging" their materials for review and for inclusion in their website resources search. SEPA/SciEd program staff were very enthusiastic about this potential partnership and look forward to next steps.

Participants:

Abdifatah Ahmed, University of Minnesota
Renee Bayer, Michigan State University
Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)

Liliana Bronner, University of Nebraska Medical Center
Katherine Bruna, Iowa State University
Rebecca Carter, Seattle Children's Research Institute
Donna Cassidy-Hanley, Cornell University
Melani Duffrin, Northern Illinois University
Sara Erickson, Iowa State University
Michelle Ezeoke, Georgia State University
Joan Griswold, University of Washington
Tim Herman, Milwaukee School of Engineering
Bethany Hornbeck, Apis Creative
Barbara Hug, University of Illinois Urbana-Champaign
Ralph Imondi, Coastal Marine
Berri Jacque, Tufts University
Larry Johnson, Texas A&M University
Stephen Koury, University at Buffalo
Dina Markowitz, University of Rochester
Molly Malone, University of Utah
Revati Masilamani, Tufts Medical School
Nancy Moreno, Baylor College of Medicine
Patti Parson, PBS Newshour
Kevin Phelan, University of Arkansas for Medical Sciences
Rob Rockhold, University of Mississippi
Carla Romney, Boston University
Kim Soper, University of Nebraska Medical Center
Jen Taylor, University of Utah
Debra Tyrrell, Wheeling Jesuit University
Sarah Wojiski, The Jackson Laboratory
Charles Wray, The Jackson Laboratory
J. Michael Wyss, University of Alabama at Birmingham

I'll Make You Famous-Approaching Career Development with Passion and Joy through SEPA

PRESENTER:
SANDRA SAN MIGUEL, DVM, PHD, PURDUE UNIVERSITY COLLEGE OF VETERINARY MEDICINE

This session provided participants with an opportunity for guided self-reflection on their current responsibilities, career goals, and means of attaining promotion/tenure using their SEPA programs as sources of scholarship and national recognition. Strategies for self-care, providing a climate conducive for everyone to bring their best selves, and for making the time to do the things needed to advance career goals were presented and discussed. Attendees were challenged to further articulate their career goals and the importance of those goals. The session concluded with attendees starting an action plan for career development by committing to one sustainable, actionable item they would begin this week to move forward.

Participants:

Carmela Amato-Wierda, University of New Hampshire
Manetta Calinger, Wheeling Jesuit University
Jessica Calzola, NIH/NCI
Jose Chavero Rivera, Baylor College of Medicine
Adrianne Fisch, Purdue University
Kara Lewis, MD Anderson
Julia McQuillan, University of Nebraska – Lincoln
Brandon Morgan, Health Resources in Action
Megan Morrone, Rockman Et Al
Tandy Petrov, The University of Alabama at Birmingham
LaTia Scott, Delaware State University
Louisa Stark, University of Utah
Sarah Wojiski, The Jackson Laboratory
Charles Wood, Wheeling University

The Scientist Spotlights Initiative: Integrating Counter-stereotypical Scientists in Science Courses

FACILITATORS:
KIMBERLY TANNER, PHD, PROFESSOR, SAN FRANCISCO STATE UNIVERSITY
JEFF SCHINSKE, MA, PROFESSOR, FOOTHILL COLLEGE
DAX OVID, PHD, POSTDOCTURAL FELLOW, SAN FRANCISCO STATE UNIVERSITY

The Scientist Spotlights Initiative aims to empower science instructors with inclusive science curricula as a means for students of all backgrounds to envision themselves in science. The Scientist Spotlight assignment links students to resources about counter-stereotypical scientists and their research, as an alternative method of delivering course content. Studies have shown that Scientist Spotlight assignments enhance students' relatability to scientists and improves science learning. In this session, participants could learn more about Scientists Spotlights and were informed of how to search over 200 student-authored assignments on the newly launched website.

As a result of participating in this session, NIH SciEd Conference attendees were given the tools to meaningfully integrate Scientist Spotlights in their curricula and in their outreach. Participants could start to consider how to support inclusive science curriculum by using Scientist Spotlights to teach course content, challenge scientist stereotypes, and support students' relatability to scientists.

Some key takeaways shared by participants after engaging in this session included learning to let students write reflections and support metacognitive development. Further, participants appreciated how integrating Scientist Spotlights can support students' relatability to scientists, across all personal identities and backgrounds.

Participants:

Maria Alonso Luaces, University of Kansas Medical Center
Kristin Bass, Rockman Et Al
Renee Boney-Jett, University of Minnesota
Desmond Campbell, Vanderbilt University
Paul Cotter, EvaluLogic
Dina Drits-Esser, University of Utah
Elizabeth Edmondson, Virginia Commonwealth University
Kristin Fenker, University of Utah
Ben Gorski, University of Maryland Baltimore
Ben Greenfield, University of Southern Maine
Megan Hochstrasser, University of California, Berkeley
Meghan Leadabrand, University of Nebraska, Lincoln
Rafael Leite, University of Miami
Atom Lesiak, University of Washington
Lisa Marriott, Oregon Health & Science University
Sarah Praskievicz, The University of North Carolina at Greensboro
Patrice Saab, University of Miami
Janice Straley, University of Alaska Southeast
Gwendolyn Stovall, University of Texas at Austin
Abbey Thompson, The Tech
Jennifer Ufnar, Vanderbilt University
Anne Westbrook, BSCS Science Learning
Lisa White, University of California, Berkeley
Regina Wu, Fred Hutchison Cancer Research Center

Tools of the Trade: CAISE Resources for those who Design, Implement and Study Informal STEM Learning Experiences

FACILITATORS:
SASHA PALMQUIST, PHD, SENIOR MANAGER OF COMMUNITY, CAISE
JAMIE BELL, MS, PROJECT DIRECTOR, CAISE
CECILIA GARIBAY, PHD, PRINCIPAL, GARIBAY GROUP
PANELISTS:
KEVIN CROWLEY, PHD, ASSOCIATE DEAN, UNIVERSITY OF PITTSBURGH
MARTIN STORKSDIECK, PHD, DIRECTOR – STEM RESEARCH CENTER, OREGON STATE UNIVERSITY
RABIAH MAYAS, PHD, VICE PRESIDENT OF EDUCATION, MUSEUM OF SCIENCE AND INDUSTRY, CHICAGO, IL

Participants in this session:

- Learned about task force tools that can be used to engage in reflecting on programs and organization practices.
- Expanded their social networks to include those who are pursuing efforts to support equitable and accessible informal STEM learning.
- Shared experiences and ideas for additional CAISE resources and research.
- Left with a set of free, online tools to use in professional practice.

Participants:

TaShara Bailey, University of Maryland Baltimore
Renee Boney-Jett, University of Minnesota
Katherine Bruna, Iowa State University
Maribel Campos, COHeAL
Clayton Coffman, Vanderbilt University
Jamie Cornish, Montana State University
Kevin Crowley, Center for Advancement of Informal Science Education
Jenica Finnegan, University of Nevada, Reno
Marnie Gelbart, Harvard Medical School
Becky Gonda, University of Pittsburgh
Elizabeth Grace, Washington State University
Alex Gurn, Rockman Et Al
Megan Hochstrasser, University of California, Berkeley
David Holben, University of Mississippi
Tania Jarosewich, Censeo Group
Molly Kelton, Washington State University
Megan Keniry, The University of Texas Rio Grande Valley
Neil Lamb, HudsonAlpha Institute for Biotechnology
Weiling Li, Purdue University
Kauionalani Mead, Hawaii/Pacific Basin Area Health Education Center
Cynthia Nazario-Leary, University of Florida
Caitlin Nealon, The Tech Interactive
Cecilia Nguyen, Oregon Museum of Science and Industry
Elizabeth Parker, University of Maryland, Baltimore
Daoming Qin, Steamify llc
Amy Spiegel, University of Nebraska – Lincoln
Anastasia Thanukos, University of California, Berkeley
Jackie Valett, Emory University

Evaluator Networking Session II – Evaluation Challenges and Successes During COVID

FACILITATOR:
LORAN CARLETON PARKER, PHD, ASSOCIATE DIRECTOR, SENIOR RESEARCH AND EVALUATION ASSOCIATE, PURDUE UNIVERSITY

The attendees discussed Covid challenges such as zoom fatigue and navigating IRB challenges when collecting data remotely.

Attendees identified ways to "meet participants where they are" on the internet such as by using TikTok or new platforms that are well-designed such as THINKdemic (https://www.thinkdemic.com/home).

One persistent problem of practice that was present before but exacerbated by COVID is partnerships with schools for collecting research and evaluation data.

Attendees suggested developing partnerships with local and national teacher associations to promote buy-in among teachers and create allies for working with school administrators. Also suggested was giving teachers enhanced autonomy to use resources as they see fit.

Attendees raised questions around curriculum implementation/program implementation fidelity when working with many teachers. Attendees wondered when and in what cases it was crucial for teachers to use materials in specific ways. It is beneficial for research, but is it beneficial for the teachers and for learning?

We discussed different areas of research and evaluation that would benefit from more cross-program collaboration. Instrument and protocol sharing was agreed to be high on that list. Can we create an instrument repository, or use existing instrument/protocol/data publication avenues to create a sharing community for SEPA? Attendees felt that a working group would be the next step to move this forward.

How Can Science Research Design be Incorporated into the High School Science Classroom?

FACILITATORS:
BRETT TAYLOR, MED, EDUCATION COORDINATOR, UNIVERSITY OF MONTANA SCHOOL OF PUBLIC AND COMMUNITY HEALTH SCIENCES
TONY WARD, PHD, DEPARTMENT CHAIR, UNIVERSITY OF MONTANA SCHOOL OF PUBLIC AND COMMUNITY HEALTH SCIENCES
DAVID JONES, MS, PEDAGOGY SPECIALIST, UNIVERSITY OF MONTANA SCHOOL OF PUBLIC AND COMMUNITY HEALTH SCIENCES

Science is a systematic, problem-solving process based on observation, experiment, and modeling. However, students in traditional science classes rarely, if ever, get the opportunity to do actual science. If it is important for students to understand the practices of science as well as the content of science, then it should be equally important that students get the opportunity to experience actual science research. The University of Montana School of Public and Community Health Sciences' REACH Program facilitates science understanding by assisting students to engage in scientific research – learning about science by doing science. This session explored the various components of the research design process that are used by students in the REACH Program to conduct air quality-based scientific investigations.

Dr. Tony Ward, the principal investigator for the REACH Project, began the session with a a brief overview of the project including project goals.

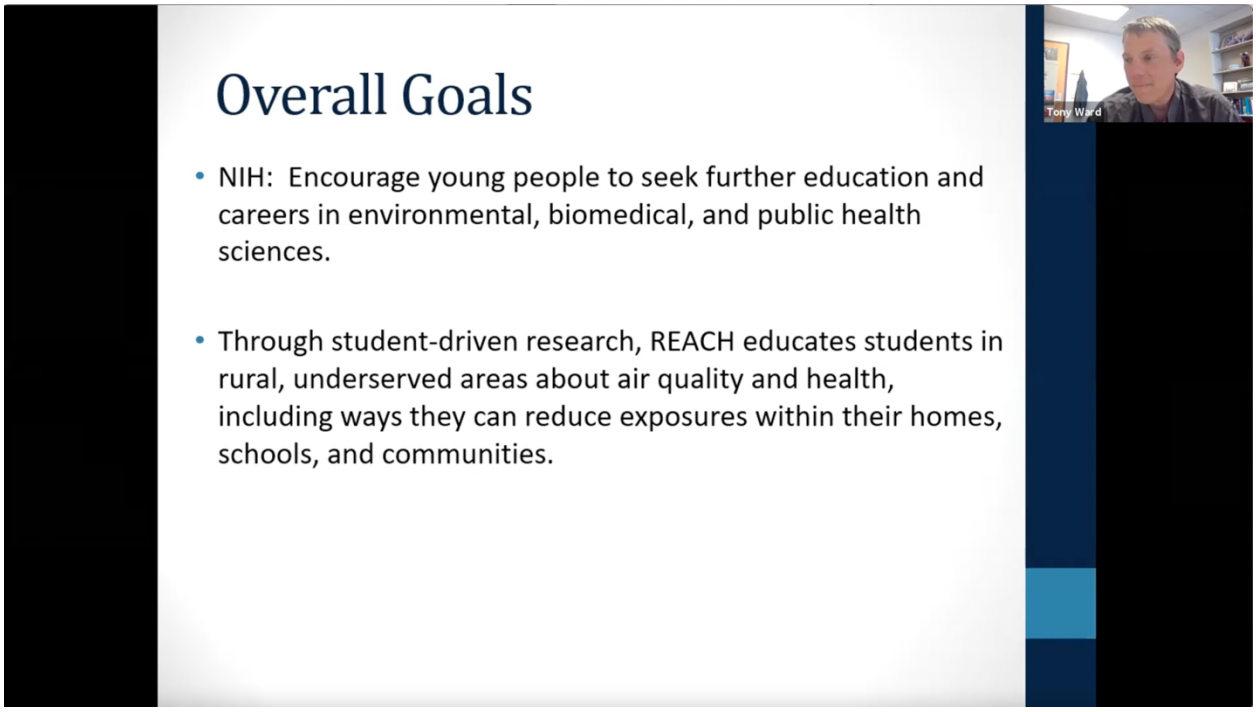
Participants then used the zoom chat function to brainstorm and discuss three questions: How are science classes different from actual science? What are important science practices that should be incorporated into the science classroom? What are the barriers to including science practices in the science classroom?

Next, Brett Taylor, the Education Coordinator for the REACH Project, summarized the relevant features of the "How do you design a successful science research project?" lesson developed through the REACH Project. David Jones, a recently retired REACH Project teacher, discussed how he integrated the science research component of the REACH Project in his classroom.

Two common themes emerged from the presentation and discussion:

- Participants were largely in agreement that teaching science practices should be included in science curriculum.
- The main barrier to implementing science practices into the curriculum is time. What content will instructors have to sacrifice to incorporate science practices? The REACH Program provides a platform, equipment and resources, and expertise for incorporating air quality-based science

research into the science classroom. This helps to mitigate the time and organizational impact on the teacher.



Participants:

TaShara Bailey, University of Maryland Baltimore
Robin Bartlett, University of Alabama
Deanna Buckley, University of Texas at Austin
Manetta Calinger, Wheeling Jesuit University
Ellen Chenoweth, University of Alaska Southeast
Michael Coe, Cedar Lake Research Group LLC
Martina Efeyini, University of Maryland, Baltimore
Noah Glaser, University of Connecticut
Maurice Godfrey, University of Nebraska Medical Center
Kymberly Grantham, Georgia State University
Ella Greene-Moton, University of Michigan
Dana Haine, University of North Carolina at Chapel Hill
Renee Hesselbach, University of Wisconsin – Milwaukee
Carolyn Hester, University of Montana
Mary Kay Hickey, Cornell University
Kathleen Hill, Penn State University
Jana Jaran, Barnard College
Anna Kiley, University of Montana
Mary Larson, Salish Kootenai College
Mia Minen, University of Tennessee, Knoxville
Osvaldo Morera, University of Texas, El Paso
Caitlin Nealon, The Tech Interactive
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
David Petering, University of Wisconsin-Milwaukee
Tomekia Simeon, Dillard University
Anastasia Thanukos, University of California, Berkeley

Melinda VanDevelder, Virginia Commonwealth University
Sequoia Wright, University of Maryland, Baltimore
Regina Wu, Fred Hutchison Cancer Research Center
Kristine Wylie, Washington University

Broader Impacts of Near-Peer Mentoring: Addressing Barriers to Participants in STEM

PANELISTS:
DEBRA YOURICK, PHD, DIRECTOR, SCIENCE EDUCATION AND FELLOWSHIP PROGRAMS, WALTER REED ARMY INSTITUTE OF RESEARCH
HOLLY BROWN, PHD, NATIONAL ACADEMIES FELLOW, WALTER REED ARMY INSTITUTE OF RESEARCH
BRITTANY CLAWSON, PHD, NATIONAL ACADEMIES FELLOW, WALTER REED ARMY INSTITUTE OF RESEARCH
NATHAN BERGER, PHD, DISTINGUISHED PROFESSOR, CASE WESTERN RESERVE UNIVERSITY
CATHERINE MORTON, EDD, INTERIM ASSISTANT VICE PRESIDENT FOR HEALTH SCIENCES, WEST VIRGINIA UNIVERSITY

In this session on the roles of Near-Peer Mentors (NPMs) in broadening participation in STEM pathways to underserved and underrepresented populations, Dr. Berger spoke about his experience with the SEO/YES program at Case Western University, Dr. Morton spoke about her experience with the HSTA Program at West Virginia University, and Drs. Debra Yourick, Holly Brown and Brittany Swift spoke about their experiences with the Gains in the Education of Mathematics and Science ("GEMS") program at the Walter Reed Army Institute of Research. All of these programs use NPMs to better relate to, teach, and mentor younger students.

The SEO/YES program, in which MD/PhD students help high school students to understand medical technologies and data interpretation, was born out of issues with Cleveland area high school students struggling with psycho-social stress but not being comfortable confiding in older adults within the programs. Students found the NPMs to be helpful, and NPMs reported professional growth from the experience.

The HSTA Program is a tiered mentorship program, with a focus on positively impacting social and behavioral determinants of health, in which college students mentor high school students in a summer camp, high school students mentor elementary students, and the elementary students in turn often share what they learned with their parents. Dr. Morton emphasized that the most important aspects contributing to success of the program are: genuine relationships with students; having fun; relating information to real-life; active learning; rigor; opportunities for repetition/practice; and rewards.

The GEMS program brings hands-on, inquiry-based STEM activities to diverse 7th-12th grade students via diverse undergraduate NPMs, most of whom are recruited from the local community, and are themselves mentored by scientists at WRAIR. The GEMS program model has been successful both in summer programs and within high school classrooms. The program emphasizes

building teams of NPMs, rather than merely hiring individuals; i.e., hiring NPMs with a broad diversity of experiences, leadership styles, interests, STEM majors, etc., helps to ensure students and NPMs get a well-rounded STEM experience. They also emphasize the importance of a NPM training period, where NPMs can engage in team-building activities, learn skills for lesson plan development, teaching/mentorship, general awareness of social/ethical issues, and general STEM laboratory skills.

Participants:

TaShara Bailey, University of Maryland Baltimore
Luke Bradley, University of Kentucky
Holly Brown, Walter Reed Army Institute of Research
Alexander Chang, Seattle Children's Research Institute
Ido Davidesco, University of Connecticut
Michelle Domecki, University of Chicago
Martina Efeyini, University of Maryland, Baltimore
Nico Ekanem, Walter Reed Army Institute of Research
Michelle Ezeoke, Georgia State University
Jenica Finnegan, University of Nevada, Reno
Dana Haine, University of North Carolina at Chapel Hill
Suzanne Kirk, Virginia Commonwealth University
Mary Jo Koroly, University of Florida
Ivan Lamas-Sanchez, University of Maryland Baltimore
Jasmina Mesic, FoodMASTER
Misty Pocwierz-Gaines, University of Nebraska Medical Center
Kelli Qua, Walter Reed Army Institute of Research
Brittany Swift

Laura Tenenbaum
Abbey Thompson, The Tech
Nathan Vanderford, University of Kentucky
J. Michael Wyss, University of Alabama at Birmingham

Keynote Address:

Wednesday, May 26, 2021 – 11:00 AM – 12:00 PM

Science in Relation: the By, For, and With Who of Scientific Research and Science Education

SAVANNAH MARTIN, MA, CONFEDERATED TRIBES OF SILETZ INDIANS OF OREGON AND PHD CANDIDATE IN BIOLOGICAL ANTHROPOLOGY, WASHINGTON UNIVERSITY

Savannah began with a land acknowledgement and provided resources (https://native-land.ca/) where attendees can identify the native peoples who once were stewards of their current location. She mentioned it was grounding to acknowledge the privilege afforded to us by using this land that was taken from others.

Throughout her formal education, Savannah experienced supports that enabled her to use her assets to succeed. These supports assisted her movement through an education system that was not designed for her success.

This system and its affirmers/leaders made it difficult for her to find belonging and many of these leaders are blind to the systemic issues and pervasive racism that keep diverse students from succeeding. The "othering" that can result from unreflective community members and the resultant "unbelonging" of native and other scholars is stress inducing. For example, leading scholars in her field equated participatory, collaborative research with indigenous communities with asking "Neanderthals" what they thought of the research.

These experiences inspired Savannah's PhD research design—examining how perception of identity, status, and power through environmental and social interpolation is related to physical stress and biological changes that produce illness.

Research should reveal answers to questions, but also reveal unquestioned answers. To do this, diverse perspectives and experiences are needed in the practice of science. This can be called relational work. Having balanced relations would mean that all communities feel welcome in and have ownership of science work and practice. Having unbalanced relations in science and not including groups, results in continuation of historical trauma and perpetuation of harmful attitudes towards oppressed groups

Savannah sought input on her research focus from indigenous community members, which shifted her to look at psycho-social harms that create stress as mechanism for health disparities. Identifying these psycho-social harms that occur through the interaction between the social structures,

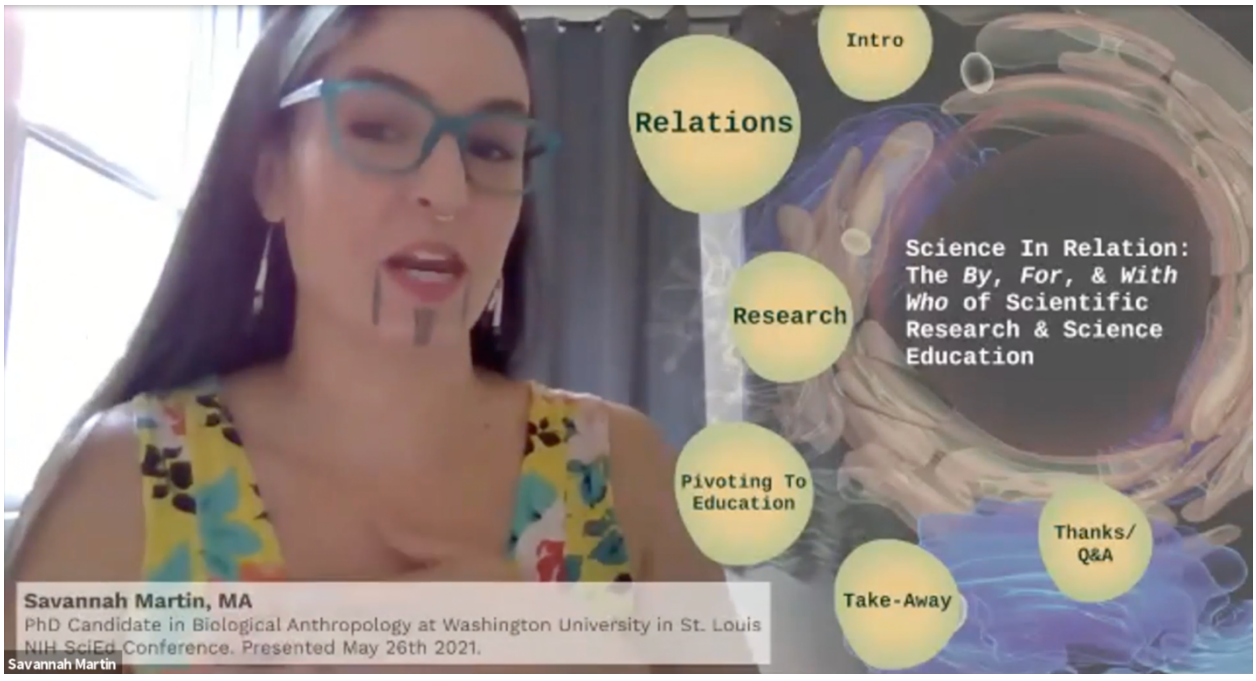
environment, and individual identities (interpolation) and linking them to biological stress and health would be a key breakthrough in our understanding AND more importantly would be in service of the indigenous community.

COVID-19 delayed Savannah's research activities and the delay made it impossible to continue with funding—the structure of the system was not designed to support students who absolutely need full funding 100% of the time. As a result, she switched to pursuing a path toward science teaching – a change that will still allow her to give back to her community and stay connected with science.

The current system does not account for the time and energy needed to conduct collaborative research and treats it as a special type of research. When it is the "gold standard" of quality that all research should be compared to because it fully articulates the BY whom, FOR whom and WHY of the research practice.

Savannah gave advice for the SEPA community for working toward this gold standard:

- always consider the BY, FOR and WHY of the research
- examine syllabi/underlying foundational knowledge for diverse perspectives and seek them out
- improve safety of environments for minoritized students
- promote programs that seek explicitly to repair relations with oppressed communities.



Concurrent Breakout Sessions:

Wednesday, May 26, 2021 – 12:00 PM – 1:00 PM

Bringing Native Voices to Education, Science and Health

FACILITATOR:
MAURICE GODFREY, PHD, PROFESSOR OF MOLECULAR GENETICS, MUNROE-MEYER INSTITUTE, UNIVERSITY OF NEBRASKA MEDICAL CENTER
PANELISTS:
SAVANNAH MARTIN, MA, CONFEDERATED TRIBES OF SILETZ INDIANS OF OREGON AND PHD CANDIDATE IN BIOLOGICAL ANTHROPOLOGY, WASHINGTON UNIVERSITY
DAVID WILSON, PHD, DIRECTOR, TRIBAL HEALTH RESEARCH OFFICE, NIH
BONNIE SACHATELLO-SAWYER, EXECUTIVE DIRECTOR, HOPA MOUNTAIN
JOE JESSEPE, INDIGENOUS SCHOLARS OF PROMISE COLLEGE COACH, HOPA MOUNTAIN

This session brought a rich discussion from the panel members about the importance of trust and the establishment of that trust with Native and other underrepresented communities.

Dr. Wilson spoke about the policies NIH has developed to ensure that data sharing prevents stigmatization of Native communities. This has been a particular problem when researchers come from the outside and do not share information with the community they are studying. Therefore, NIH has been working with tribes to empower them to lead their own research to address health disparities that may be specific to individual communities. This empowerment has come from the openness of NIH and pharma working together with Native physicians to do clinical trials in Native communities. It is important to note that it is better to form trusting relationships long before any research is even contemplated with Native communities.

The Hopa Mountain programs are geared to work from "cradle to careers" by taking the long view of working with parents and children first to encourage reading culturally relevant books and having support programs for older students to see themselves in college. College students become near peer mentors to high school students and medical and graduate students do the same for college students. This way mentees become mentors along the way.

It was also noted that academic institutions that get program funding in three to five-year increments may be forced to start – stop - then re-start programs. This can be a great disservice to minority communities who require long-term support. Thus, non-profit organizations that can fundraise outside the usual grant cycles may have some advantages.

The pandemic was particularly difficult in terms of student engagement for enrichment activities. Once school was over it became difficult to get students to connect remotely for additional

activities. Thus, money was "left on the table" because scholarship applications went unfilled. Moreover, there was some sentiment that after 13 months of virtual school the students may not be as prepared for college as previous classes had been.

There was also a caution not to consider all underrepresented or Native groups to be monolithic. Just because there is a problem in one place that does not mean it exists elsewhere. Additionally, approaches to problems need to be individualized community-by-community.

It was also noted that engaging tribal colleges may be a good way to have community participation for research. Again, these engagements need to occur long before any research would be conducted.

All speakers agreed that it is important for researchers and outside entities to listen to the communities with whom they would like to work.

Participants:

Alison Allen, Rockman Et Al
Renee Boney-Jett, University of Minnesota
Liliana Bronner, University of Nebraska Medical Center
Deanna Buckley, University of Texas at Austin

Michael Carvan, University of Wisconsin-Milwaukee
Rochelle Cassells, University of Utah
Ellen Chenoweth, University of Alaska Southeast
Jeanne Chowning, Fred Hutchinson Cancer Research Center
Victoria Coats, Oregon Museum of Science & Industry
Jamie Cornish, Montana State University
Paul Cotter, EvaluLogic
Dina Drits-Esser, University of Utah
Marnie Gelbart, Harvard Medical School
Kymberly Grantham, Georgia State University
Bethany Hornbeck, Apis Creative
Larry Johnson, Texas A&M University
Rita Karl, Twin Cities PBS
Molly Kelton, Washington State University
Shrawan Kumar, University of Nebraska Medical Center
Mary Larson, Salish Kootenai College
Emily Mathews, Northwestern University
Allison McQueen, Tuft University
Julia McQuillan, University of Nebraska – Lincoln
Diane Munzenmaier, Milwaukee School of Engineering
Andrea Panagakis, Salish Kootenai College
Misty Pocwierz-Gaines, University of Nebraska Medical Center
Sarah Praskievicz, The University of North Carolina at Greensboro
Alicia Santiago, Twin Cities Public Television
Teresa Schiff, University of Hawaii
Anja Scholze, The Tech
Tomekia Simeon, Dillard University
Joyce Solheim, University of Nebraska Medical Center
Valerie Solon, Tufts University
Bruce Stanton, Dartmouth College
Louisa Stark, University of Utah
Katie Stokes, University of Utah
Janice Straley, University of Alaska Southeast
Laura Tenenbaum
Abbey Thompson, The Tech
Dave Vannier, Fred Hutch Cancer Research Center
Anne Westbrook, BSCS Science Learning
Marlys Witte, University of Arizona


Maurice Godfrey

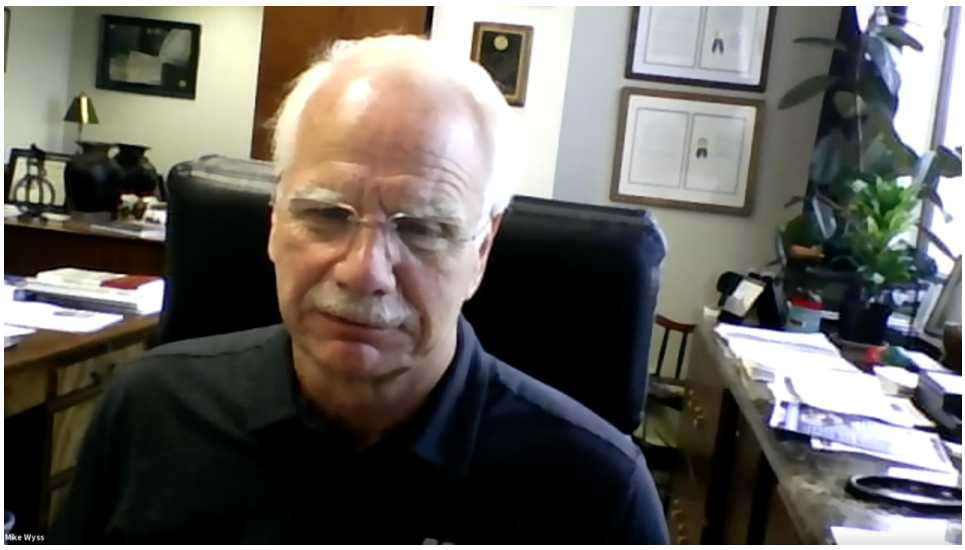
SEPA Partnerships with Other NIGMS Programs

MODERATOR:
J. MICHAEL WYSS, PHD, PROFESSOR AND DIRECTOR, UNIVERSITY OF ALABAMA BIRMINGHAM
PANELISTS:
LISA MARRIOTT, PHD, ASSOCIATE DIRECTOR, OREGON HEALTH AND SCIENCE UNIVERSITY
JANE DISNEY, PHD, SENIOR STAFF SCIENTIST, MDI BIOLOGICAL LABORATORY
DERRICK SCOTT, PHD, ASSOCIATE PROFESSOR, DELAWARE STATE UNIVERSITY
LATIA SCOTT, PHD, ASSOCIATE PROFESSOR, DELAWARE STATE UNIVERSITY

Lisa Marriott gave a brief history of how she has been a part of SEPA and how SEPA works with 11 other projects she is a part of. She emphasized how important it is to work with the teens you are trying to reach by creating peer review groups to look at how the project is representing their voices. If you do not hear from the people you are working with, you will not be able to give them what they actually need.

Jane Disney showed where you can locate more information about her SEPA project on the SEPA website. She went into detail about how they started their programs with the idea that they would have teachers and scientists work together. In this way teachers would see the scientists as mentors and learn from them. But once the program began, they learned that both parties were actually "partners." Jane explained that they learned that the teachers and scientists could gain from each other's different perspectives while doing the same task. She also talked about the importance of sharing data with the public and letting them know how the data are being used. By doing this you will create a stronger relationship with the public and gain their confidence in using the data.

LatTia Scott and Derrick Scott spoke about how they are the first SEPA program for the state of Delaware. Their 2-week summer residential program was created to provide better opportunities for middle school youth who are looking for access to STEM programing. This addresses the importance of introducing STEM programing earlier in a youth's education to create interest in science related careers. They reviewed how each of their programs work with SEPA and influence each other's work for future programing. For example, INBRE students will present at a summer symposium and in virtual seminars throughout the academic year. This will give the INBRE students practice presenting and provide the SEPA students with the real role models They emphasized that "mentorship is key."



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Participants:

Robin Bartlett, University of Alabama
Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Liliana Bronner, University of Nebraska Medical Center
Rochelle Cassells, University of Utah
Ellen Chenoweth, University of Alaska Southeast
Melani Duffrin, Northern Illinois University
Nico Ekanem, Walter Reed Army Institute of Research
Jacqueline Genovesi, Drexel University
Maurice Godfrey, University of Nebraska Medical Center
Megan Keniry, The University of Texas Rio Grande Valley
Mary Jo Koroly, University of Florida
Osvaldo Morera, University of Texas, El Paso
David Petering, University of Wisconsin-Milwaukee
Kevin Phelan, University of Arkansas for Medical Sciences
Rob Rockhold, University of Mississippi
Bruce Stanton, Dartmouth College
Charles Wray, The Jackson Laboratory

Designing NGSS-aligned Curriculum: Challenges, Successes and Lessons Learned

PRESENTERS AND FACILITATORS:
MOLLY MALONE, BS, SENIOR EDUCATION SPECIALIST, GENETIC SCIENCE LEARNING CENTER, UNIVERSITY OF UTAH
SHEILA HOMBURGER, MS, SCIENCE CONTENT MANAGER, GENETIC SCIENCE LEARNING CENTER
JEN TAYLOR, BS, EDUCATION SPECIALIST, GENETIC SCIENCE LEARNING CENTER
KRISTIN FENKER, PHD, SCIENCE CONTENT WRITER, GENETIC SCIENCE LEARNING CENTER

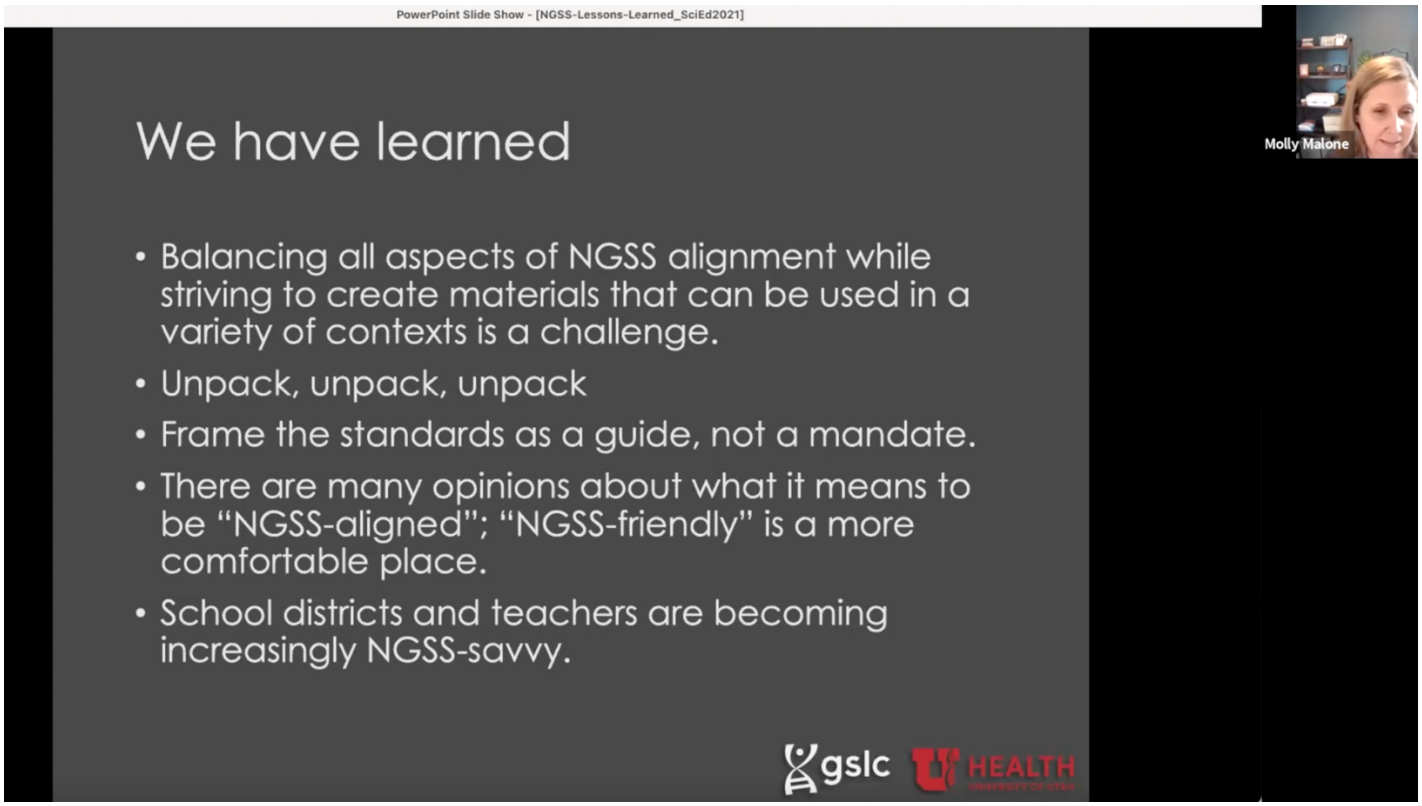
The session began with a quick summary of the three dimensions of the Next Generation Science Standards (NGSS)—Disciplinary Core Ideas (DCIs), Crosscutting Concepts (CCs), and Science and Engineering Practices (SEPs). The presenters then described how they tend to approach NGSS and how that approach has changed over the years. Their biggest "lessons learned" are as follows:

- Performance Expectations (PEs) are like formative assessments that include all three NGSS dimensions. They are great to use if they happen to work with your curriculum topic. And if they fit less well, they can be adapted to combine different NGSS elements.
- DCIs contain a lot of ideas. It is useful to "unpack" or tease them apart into assessable learning objectives, then prioritize and re-sequence the ideas in building a curriculum.
- Fully 3D, phenomenon-based learning can be highly effective but also time intensive to implement. Balancing all aspects of NGSS alignment while striving to create materials that can be used in a variety of settings is a challenge.
- Educators are becoming more familiar and comfortable with NGSS and many need less support in implementing 3D curricula than they once did.

The presenters showed a few examples of how they incorporated various NGSS elements in curriculum projects, then everyone went to breakout rooms to discuss the following:

- What are your NGSS challenges and successes?
- How do you see your role?
    - Providing a fully fleshed-out NGSS-aligned experience
    - Making materials that can be used piecemeal to create an NGSS-aligned experience
- What questions or thoughts do you have about implementing NGSS?

At the end, a person from each breakout room summarized the discussion for the whole group.



Participants:

TaShara Bailey, University of Maryland Baltimore
Thomas Boland, University of Texas at El Paso
Loretta Brady, Saint Anselm College
Liliana Bronner, University of Nebraska Medical Center
Kate Buckman, Dartmouth College
Manetta Calinger, Wheeling Jesuit University
Rebecca Carter, Seattle Children's Research Institute
Donna Cassidy-Hanley, Cornell University
Jose Chavero Rivera, Baylor College of Medicine
Carol Colanino-Meeks, Southern Illinois University Edwardsville
Dina Drits-Esser, University of Utah
Daniel Fernandez, California State University, Monterey Bay
Joan Griswold, University of Washington
Mary Kay Hickey, Cornell University
Barbara Hug, University of Illinois Urbana-Champaign
Ralph Imondi, Coastal Marine
Candice Johnson, Southern Illinois University Edwardsville
Stephen Koury, University at Buffalo
Dina Markowitz, University of Rochester
Consuelo Morales, Michigan State University
Linda Morell, University of California, Berkeley
Daniel Meyer, Northwestern University
Robyn Pennella, St. Jude Children's Research Hospital

David Petering, University of Wisconsin-Milwaukee
Tandy Petrov, The University of Alabama at Birmingham
Kevin Phelan, University of Arkansas for Medical Sciences
Emaly Piecuch, The Jackson Laboratory
Rosemary Riggs, Texas Biomedical Research Institute
Carla Romney, Boston University
Patrice Saab, University of Miami
Teresa Schiff, University of Hawaii
Kim Soper, University of Nebraska Medical Center
Regina Wu, Fred Hutchison Cancer Research Center
Kristine Wylie, Washington University

Breaking Down Cultural Barriers to STEM Education for Middle Schoolers

PRESENTERS:
KASSY ROUSSELLE, BS, HEALTH & WELLNESS COORDINATOR AND TRAINER, OREGONASK
ALICIA SANTIAGO, PHD, TWIN CITIES PBS

This was an interactive session about CEREBROedu, a Twin Cities PBS national Spanish/English informal education project funded by SEPA that provides culturally competent programming and media resources about the brain's structure and function to Latinx middle school students and their families. The program aims at increasing youth interest and engagement in STEM studies and neuroscience, and mental health career options, and in reducing mental health stigma, thus increasing help-seeking behavior.

During the session participants learned how CEREBROedu empowers informal STEM educators to integrate cultural responsiveness into the structure and pedagogy of their afterschool programs to promote youth development, and how to create a welcoming space and build authentic relationships with Latinx youth and families to effectively engage them in STEM learning.

The session started with a reflection activity where participants shared their experiences working with Latinx or other diverse populations. Challenges and barriers were also discussed. Examples:

> *"We work with a school district that has a higher Latinx population. It's hard to attract students, who need parental approval and engagement. There are many barriers with this family participation. There are also housing issues, especially around privacy."*

> *"We are working with a Latinx charter. We also had a family STEM night and all content was translated into Spanish. We also always offer food. We find that it's important for students and teachers be able to communicate with parents, particularly around our topic (DNA)"*

Presenters gave an overview of the CEREBRO program and discussed the use of media and outreach components. This was followed by a discussion on cultural responsiveness. Examples:

> As *"a researcher often working with culturally and linguistically diverse students and families, it's crucial to be a good listener and observer, to communicate regularly + clearly, and to invest time in trust building from the start. It is useful to have multi-lingual skills, translated materials, if not bilingual staff or interpreters available when necessary".*

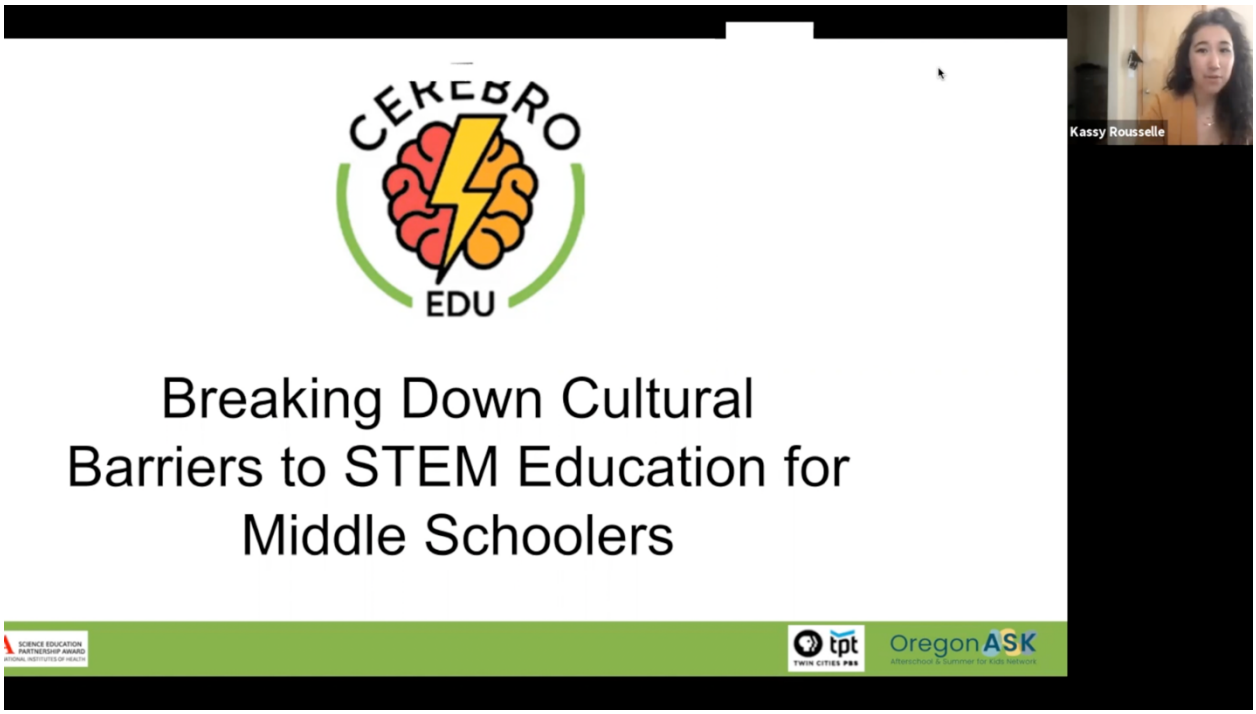
> *"Understanding the unique cultural experiences of your target group, considering their strengths, and building on these."*

> *"Cultural responsiveness is possibly respectful listening."*

"My one phrase for cultural responsiveness is student-choice."

The last part of the session included a discussion of key culturally responsive approaches to keep in mind with Latinx programming. Some of these include:

- Build relationships and establish trust
- Involve families
- Make it culturally relevant
- Emphasize the educational components
- Emphasize careers
- Be open/flexible to new ways of presenting the program



Participants:

Abdifatah Ahmed, University of Minnesota
Carmela Amato-Wierda, University of New Hampshire
TaShara Bailey, University of Maryland Baltimore
Tanicia Burns, Northwestern University
Karen Burns-White, Dana-Farber/Harvard Cancer Center
Manetta Calinger, Wheeling Jesuit University
Desmond Campbell, Vanderbilt University

Rebecca Carter, Seattle Children's Research Institute
Alexander Chang, Seattle Children's Research Institute
Michelle Ezeoke, Georgia State University
Elizabeth Genne-Bacon, Tufts University
Melinda Gibbons, University of Tennessee, Knoxville
Ben Greenfield, University of Southern Maine
Alex Gurn, Rockman Et Al
Susan Hershberger, Miami University
Belen Hurle, NIH/NHGRI
Jana Jaran, Barnard College
Candice Johnson, Southern Illinois University Edwardsville
Rita Karl, Twin Cities PBS
Meghan Leadabrand, University of Nebraska, Lincoln
Teresa MacDonald, University of Kansas
Kauionalani Mead, Hawaii/Pacific Basin Area Health Education Center
Hilleary Osheroff, Exploratorium Teacher Institute
Kristin Pederson, Twin Cities PBS
Kevin Phelan, University of Arkansas for Medical Sciences
Michael Pickart, Concordia University Wisconsin
Anastasia Thanukos, University of California, Berkeley
Debra Tyrrell, Wheeling Jesuit University

Integrating a 3D Collaborative Virtual Learning Environment into a Middle/High School Science Curriculum.

PRESENTERS:
IDO DAVIDESCO, PHD, ASSISTANT PROFESSOR OF LEARNING SCIENCES, UNIVERSITY OF CONNECTICUT
NOAH GLASER, PHD, POSTDOCTORAL RESEARCH ASSOCIATE, UNIVERSITY OF CONNECTICUT

The session focused on introducing attendees to an open-source collaborative three-dimensional virtual environment software suite called Mozilla Hubs. Participants were introduced to the BrainWaves curriculum (a SEPA-funded high school neuroscience curriculum) and challenges in adapting curricula from face-to-face to online-only formats were outlined. The presenters then introduced the affordances of the technology to share how tools like this could be used to assist others in their transition to online.

Session participants were then able to explore a collaborative scavenger hunt activity and were scaffolded through an interactive session where they were able to create their own 3D assets and to manipulate a virtual world.

As part of this experience, attendees engaged in a series of semi-structured discussions that sought to examine:

- Potential challenges and opportunities in integrating this technology in middle/high school as well as informal science contexts.
- Potential use cases in developing virtual learning environments to support SEPA-funded projects
- Methods of translating face-to-face instruction to online formats through such technologies

Participants:

Renee Bayer, Michigan State University
Loretta Brady, Saint Anselm College
Jose Chavero Rivera, Baylor College of Medicine
Adam Hott, Hudson, Alpha Institute for Biotechnology
Tania Jarosewich, Censeo Group
Larry Johnson, Texas A&M University
Travis Kelleher, Baylor College of Medicine
Atom Lesiak, University of Washington
Cynthia Nazario-Leary, University of Florida
Amy Spiegel, University of Nebraska – Lincoln
Torri Whitaker, Texas A&M University
Charles Wood, Wheeling University
Kristine Wylie, Washington University

Strategies for Working with Research Comparison Groups

FACILITATOR:
KRISTIN BASS, PHD, SENIOR RESEARCH ASSOCIATE, ROCKMAN ET AL COOPERATIVE
PANELISTS:
ALANA NEWELL, PHD, ASSISTANT PROFESSOR, BAYLOR COLLEGE OF MEDICINE
LORAN PARKER, PHD, ASSOCIATE DIRECTOR & SENIOR EVALUATION AND RESEARCH ASSOCIATE, PURDUE UNIVERSITY
WEILING LI, PURDUE UNIVERSITY

This panel presentation considered methods for identifying and engaging comparison groups for research and evaluation at the school, teacher, and student levels. An experienced group of SEPA evaluators shared their experiences and took audience questions.

Dr. Weiling Lu discussed the purpose of a control group, types of control groups, and factors in selecting a control group. She also shared research design standards from the U.S. Department of Education's What Works Clearinghouse, which differentiate between standards for randomized controlled trials and quasi-experimental designs. She concluded by listing some challenges associated with control group implementation.

Dr. Loran Carleton Parker presented open-source databases for downloading and sharing comparison group data for educational studies. For example, the PEERS Data Hub (Partnership for Expanding Education Research in STEM; https://www.icpsr.umich.edu/web/pages/peersdatahub/) contains mostly student achievement data from national surveys, though there are plans to expand the available outcomes. Dr. Parker encouraged the audience to "be the change" and consider "the best mechanism for enhancing data sharing and use practices among SEPAs."

Finally, Dr. Alana Newell described the study design for the Baylor College of Medicine's K-3 STEM Foundations SEPA, which uses three arms (full program implementation, partial implementation, and business-as-usual). She discussed some of the challenges, including uneven attrition, an imperfect matching process, and inconsistencies in the business-as-usual condition. She also shared strategies for addressing those challenges, such as adjusting groups after assignment but before data collection.

During the question-and-answer period, the group discussed the value of submitting studies to the What Works Clearinghouse; the application of open science practices for preparing, distributing, and giving credit for data; and human subjects requirements for open data. Audience members noted that data exchanges within the SEPA community could facilitate the validation of common instruments with a large, aggregated set of participants.

Participants:

Maria Alvarez, El Paso Community College
TaShara Bailey, University of Maryland Baltimore
Jocelyn Dixon, East Carolina University
Renee Hesselbach, University of Wisconsin – Milwaukee
Amanda Jones, Seattle Children's Research Institute
Brinley Kantorski, Partnerships in Prevention
Atom Lesiak, University of Washington
Lindley McDavid, Purdue University
Sandra San Miguel, Purdue University
Carlos Penilla, University of California San Francisco
Kelli Qua, Walter Reed Army Institute of Research
Virginia Stage, East Carolina University
Shelley Stromholt, Aspect Research + Evaluation
Wendy Suzuki, New York University
Laura Tenenbaum

Partnerships with Schools, Nonprofits, and Community Partners: Successes and Failures

Panelists:

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

Kevin Morris, PhD, National Academies Fellow, Walter Reed Army Institute of Research

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

Luke Bradley, PhD, Associate Professor, University of Kentucky

Rebecca Smith, PhD, Faculty, University of California San Francisco

With presentations from each of the panelists, not surprisingly, the discussion was wide-ranging in exploring how some partnerships flourished and how in other cases alternatives needed to be explored to foster STEM education research partnerships. Dr. Nancy Moreno described multi-level programs, elementary to undergraduate, through her years of work at Baylor, covering curriculum, STEM clubs and teacher professional development in partnership with schools at all levels and with

numerous universities. Recommendations included not just reaching out, but co-planning and working with partners to determine family and teacher needs, using formative assessments to update programs, leveraging existing models, technology, and expertise in new ways, continuing to forge ahead while expecting the unexpected and always being willing to move to Plan B. Dr. Rebecca Smith, at UCSF, perfectly combined the panelists' thoughts by clearly outlining successful partnership strategies including top-down/bottom-up approaches, flexibility, and varied funding sources over the years. Dr. Luke Bradley (University of Kentucky) also emphasized properly placed and varied partnerships for versatility. With many years creating and carrying out programs in science outreach during the summer and within area high schools, Dr. Debra Yourick, at the Walter Reed Army Institute of Research, brought up the cultivation of relationships with area HBCUs and MSIs, underpinned by leadership support and education agreements, which allow for resource sharing, initiation of new efforts, expansion of funding sources, from public to private, and broader benefits to participants and near-peer mentors, including stipends, course credit and extensive experiential learning through the educational hierarchy. Changing leadership, limited funding, lots of teacher/principal movement and differing IRB processes in Maryland and DC schools have always presented limitations to partnership success for the WRAIR group.

Participants:

Julie Bokor, University of Florida
Loretta Brady, Saint Anselm College
Holly Brown, Walter Reed Army Institute of Research
Jose Chavero Rivera, Baylor College of Medicine
Chris Doyle, Montana Tech University
Dina Drits-Esser, University of Utah
Brittney Edwards, University of Texas MD Anderson Cancer Center
Martina Efeyini, University of Maryland, Baltimore
Nico Ekanem, Walter Reed Army Institute of Research
Jenica Finnegan, University of Nevada, Reno
Adrianne Fisch, Purdue University
Katharina Furrs, University of Maryland, Baltimore
Becky Gonda, University of Pittsburgh
Kymberly Grantham, Georgia State University
Ella Greene-Moton, University of Michigan
David Holben, University of Mississippi
Berri Jacque, Tufts University
Lauren Johnson, Washington University in St. Louis
Ivan Lamas-Sanchez, University of Maryland Baltimore
Neil Lamb, HudsonAlpha Institute for Biotechnology
Kara Lewis, MD Anderson
Revati Masilamani, Tufts Medical School
Atom Lesiak, University of Washington
Jasmina Mesic, FoodMASTER
Brandon Morgan, Health Resources in Action
Caitlin Nealon, The Tech Interactive
Cecilia Nguyen, Oregon Museum of Science and Industry
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
Brittany Swift
Sarah Will, Partnerships in Prevention
Sarah Wojiski, The Jackson Laboratory

James Wong, The Tech
Sequoia Wright, University of Maryland,
Baltimore

Themed, Multi-topic Session: Research and Learning

Wednesday, May 26, 2021 – 3:00 PM – 4:00 PM

eCLOSE Institute: Creating Science Spaces for Teachers and Students in Biomedical Research

PRESENTERS:

DARA RUIZ-WHALEN, MSED, EXECUTIVE DIRECTOR AND CHIEF LEARNING OFFICER, ECLOSE INSTITUTE

ALANA O'REILLY, PHD, EXECUTIVE DIRECTOR AND CHIEF SCIENTIFIC OFFICER/ASSOCIATE PROFESSOR, ECLOSE INSTITUTE AND FOX CHASE CANCER CENTER

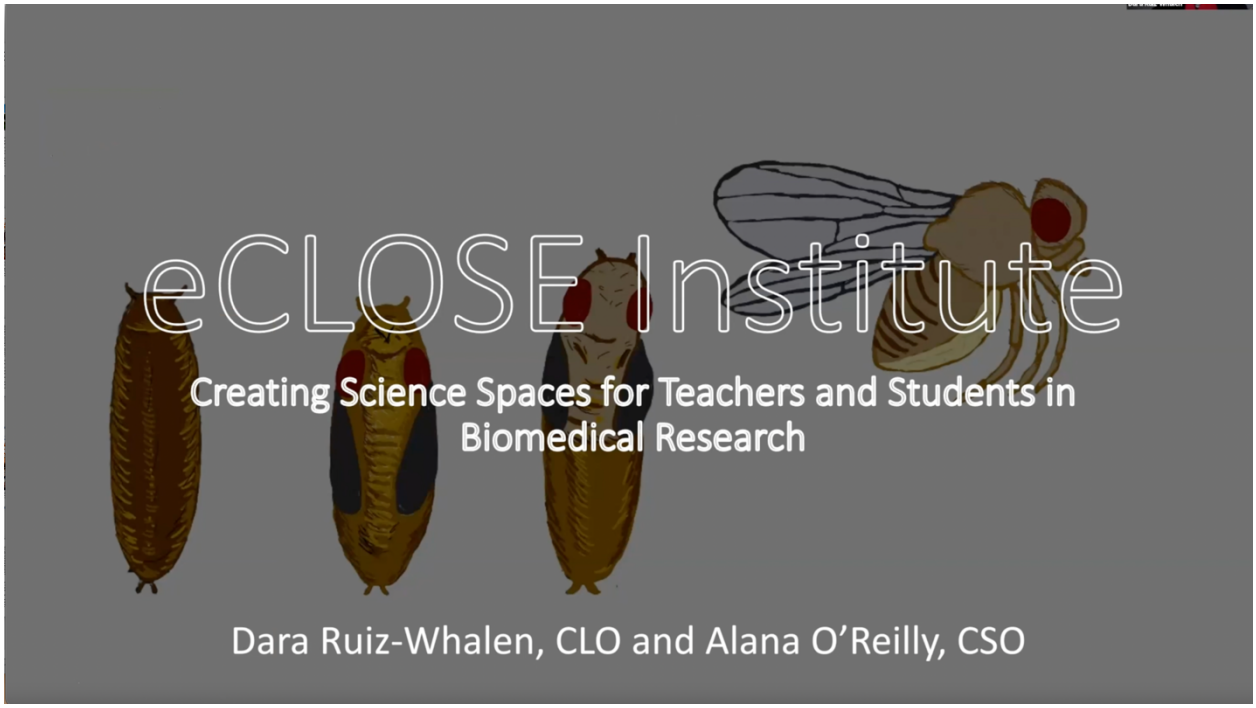
The eCLOSE presentation highlighted the Institute's current cancer and disease research training programming which has grown in the last two years to nationwide coverage. eCLOSE Institute, formed as a local Philadelphia, PA program focused on diet and its impact on disease signaling pathways, was started by Dara Ruiz-Whalen and Alana O'Reilly in 2019 following a successful win of two prizes at the Milken-Penn Education Entrepreneur competition. With the devastating arrival of COVID-19 in the US, all face-to-face programs were shut down and eCLOSE made a swift pivot to the world of virtual learning. Quickly redesigning the curriculum and creating the eCLOSE Institute lab@home kits, the program reached students from New Jersey to California in 2020. This year, eCLOSE was identified by the American Cancer Society to run a week-long program for five of the ACS-SHE sites across the country! eCLOSE Institute also welcomes students as young as rising 6th graders to participate in the authentic research summer camps.

A driving force behind eCLOSE Institute's programming is connecting to teachers and making the research applicable to their students, their neighborhoods, and the surrounding cultures. Through a three-day conference, in 2019, Dara and Alana brought together scientists and science teachers from across the country to collaborate and find connections between the curricula of the teachers and the research of the scientists. We find that by empowering the teachers and their students to drive the focus of the research provides a rich experience for the learners and opens avenues of data collection for the researchers.

Harnessing this citizen science approach, eCLOSE is able to engage 100's of students each year in authentic, research driven projects. What sets us apart is the movement of this very early, preliminary data to the lab bench. Even better, students whose data is used to move the project forward in advanced steps have been and will be identified as authors for peer-reviewed publications. During the session a table highlighting data collected at a recent eCLOSE workshop at Genetics Society of America, was shared. Further supporting the strength (in numbers) of the citizen science approach for biomedical research.

Participants of the session took part in a "pop-quiz" designed to get conversation started about what is healthy food vs unhealthy food. The responses collected via Poll Everywhere were key to illustrating the differences in perspective and perception of the "heathy" diet and how what is good for one person may be terrible for another.

The presentation concluded with participants entering responses to "How can the attendees get local schools (teachers and students) involved in their research?" and "What projects do they have that could be propelled forward working with similar approaches?" These responses were assembled via Poll Everywhere and shared back out in live time.



Bioinformatics-Based Research to Investigate the Function of Genes Predicted to be Hypothetical

PRESENTER:
STEPHEN KOURY, PHD, RESEARCH ASSOCIATE PROFESSOR, JACOBS SCHOOL OF MEDICINE AND BIOMEDICAL SCIENCES UNIVERSITY AT BUFFALO

Work presented in this session was performed in collaboration with the Consortium for Increasing Research and Collaborative Learning Experiences (CIRCLE) SEPA project at the Area Health Education Center, University of Hawaii and John A. Burns School of Medicine. The session began with a discussion on how bioinformatics-based approaches can overcome some typical limitations of exposing students to authentic research, including the limitation by laboratories and PIs to student access for hands on authentic laboratory experiences, the time commitment involved to train students, and the laboratory and personnel costs associated with the training. The presentation was framed around the concept of using annotation of hypothetical genes from the bacteria *Kytococcus sedentarius* to allow students to apply the scientific method for answering questions in the assignment about genes. An online gene annotation toolkit known as GENI-ACT (https://geni-act.org/) was customized for the project to allow students to collect and interpret data from remote locations. The goal of student research was to answer the following questions: Is there a better name than hypothetical for the genes under investigation? Is there evidence of sufficient conservation of the gene among microbial species to initiate wet lab experiments? Students also designed PCR primers for both the cloning of the gene under investigation as well as for quantitative reverse transcriptase PCR that can be used to investigate expression of the genes. The student research will be used to provide a solid foundation of information about which *Kytococcus* hypothetical genes are candidates for wet lab experiments by undergraduate and graduate students at the University at Buffalo, and thus also illustrates the collaborative nature of modern scientific investigation. Given the large number of prokaryotic genomes that have been sequenced, this approach offers an essentially unlimited opportunity for authentic research investigations by high school students that could transition to actual wet lab investigations.

Repurposing a CRISPR Virtual Reality Experience for Diverse Educational Uses

PRESENTER:
MEGAN HOCHSTRASSER, PHD, EDUCATION PROGRAM MANAGER, INNOVATIVE GENOMICS INSTITUTE AT UC BERKELEY

The Innovative Genomics Institute (IGI) is a partnership between UC Berkeley and UC San Francisco, founded by Jennifer Doudna to solve major world problems with genetic engineering, in an ethical, equitable manner. The IGI puts a strong emphasis on educating and engaging the public. One of the IGI's flagship projects is developing a CRISPR-based therapy for sickle cell disease. To inform lay audiences about this initiative, Dr. Hochstrasser, IGI's Education Program Manager, partnered with Dr. Lee Bishop at UC Berkeley's Lawrence Hall of Science and Laura Lynn Gonzalez at the science visualization company Dynamoid. Together, the team developed an immersive virtual reality (VR) module that simulates sickle cell disease and the IGI's CRISPR-based therapy. While VR may seem intimidating, it has great potential to attract interest, convey complex concepts, and serve in a surprising variety of educational contexts. The CRISPR-VR team has incorporated their single VR creation into 1) in-person engagement at outreach events, 2) a planetarium show, 3) a virtual 360˚ field trip, 4) a video for an online outreach event, and more. Next, they'd like to package the planetarium show and distribute it to other science centers with domes to reach broader audiences. They also plan to port the experience to a new VR system with no wires or need for a gaming computer. Dr. Hochstrasser is now working with university biology instructors who are incorporating VR into undergraduate- and graduate-level cell biology classes. In the long-term, she hopes to work with sickle cell patient-advocates to enhance the experience and use it for wider outreach in the sickle cell community.

Participants:

Carmela Amato-Wierda, University of New Hampshire
TaShara Bailey, University of Maryland Baltimore
Robin Bartlett, University of Alabama
Luke Bradley, University of Kentucky
Katherine Bruna, Iowa State University
Karen Burns-White, Dana-Farber/Harvard Cancer Center
Donna Cassidy-Hanley, Cornell University
Alexander Chang, Seattle Children's Research Institute
Jose Chavero Rivera, Baylor College of Medicine
Ellen Chenoweth, University of Alaska Southeast
Jasmine Donkoh, Colorado State University
Adrianne Fisch, Purdue University
Maurice Godfrey, University of Nebraska Medical Center
Ben Greenfield, University of Southern Maine
Tim Herman, Milwaukee School of Engineering
Renee Hesselbach, University of Wisconsin – Milwaukee
Mary Kay Hickey, Cornell University

Mark Hoelzer, Milwaukee School of Engineering
Sheila Homburger, University of Utah
Tania Jarosewich, Censeo Group
Mary Jo Koroly, University of Florida
Kara Lewis, MD Anderson
Lindley McDavid, Purdue University
Diane Munzenmaier, Milwaukee School of Engineering
Loran Parker, Purdue University
Marisa Pedulla, Montana Technological University
Carla Romney, Boston University
Louisa Stark, University of Utah
Kimberly Tanner, San Francisco State University
Sarah Wojiski, The Jackson Laboratory

Themed Session: Informal Science Education

Wednesday, May 26, 2021 – 3:00 PM – 4:00 PM

We Engage 4 Health Rap Sessions

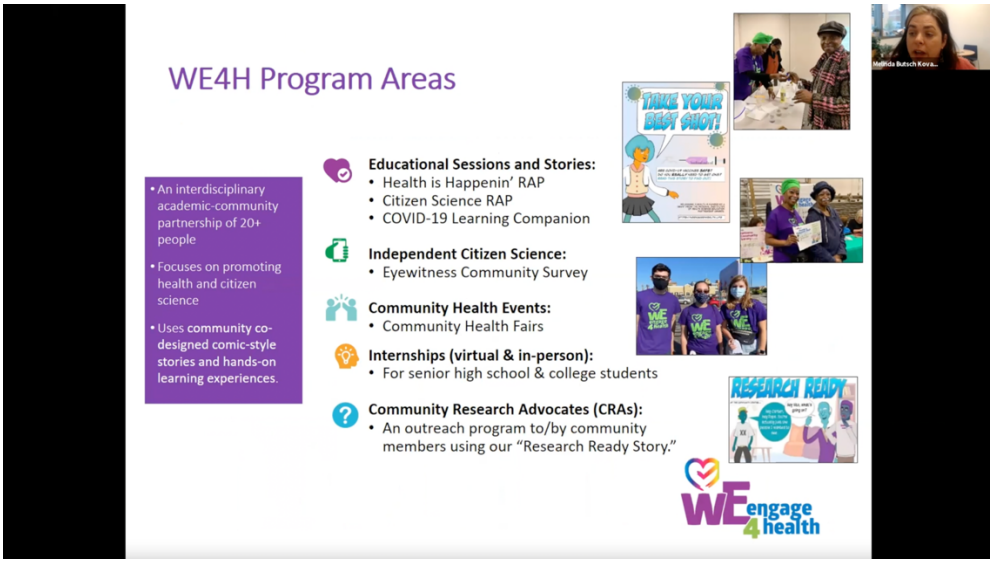
PRESENTERS:
MELINDA BUTSCH KOVACIC, MPH, PHD, PROFESSOR, CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER UNIVERSITY OF CINCINNATI
SUSAN HERSHBERGER, PHD, DIRECTOR, CENTER FOR CHEMISTRY EDUCATION, MIAMI UNIVERSITY
SUSAN GERTZ, MS, MIAMI UNIVERSITY

We Engage for Health (WE4H) is a 20+ member interdisciplinary academic–community partnership focused on promoting health and citizen science in local communities. The goal of WE4H is to help residents of Cincinnati and beyond to become aware of health challenges in their communities, take part in health and science activities, consider STEM careers, contribute to better health of their families, and for those would like deeper involvement, to lead activities that improve the health of their communities. WE4H is different because we co-create our program materials with community partners, we engage and encourage learning through stories featuring a cast of community characters with rich backstories that participants "get to know", we offer hands-on activities to promote active learning and our WE4H programs can be offered on site or online! Stories are powerful tools to address health literacy particularly as only 12% of Americans have the health literacy skills they need to pursue and obtain health. WE4H's comic-style stories are read out loud together to spur discussion and raise participants' awareness of health issues. They provide a shared foundation that helps participants to better understand and make sense of the material and ease discomfort and frustration. WE4H stories create engagement, improve learning, and influence behavior; further, stories are memorable and more easily shared! Finally, our comic or graphic style stories are not just for kids; they are read by every age and in every genre across the world!

In this session, we presented our RAP sessions and our Eyewitness Community Survey tool. RAP stands for 1) recognize our health needs, 2) ask questions, and 3) promote healthy actions. Our Health is Happenin' RAP topics* include wellness, chronic diseases (heart disease, asthma, arthritis, and diabetes); nutrition and lifestyle; genetics; and environmental health. Our Citizen Science RAP topics include understanding citizen science, the ethics of research, citizen science, asking research questions, collecting and analyzing data, and creating reports and maps to share the data with the community. RAP Sessions are a series of eight one-hour meetings about health and science topics. Details of the program can be personalized to meet the needs of the community. If a meal is provided, meetings may last 1.5 hours total. Middle schoolers, teens and adults who want to learn about health in the community and how to help improve it are invited to participate. Participation is

recognized with virtual badges, t-shirts and more! 100% of our Health is Happenin' RAP participants indicated they would recommend this program to a friend or family member and attend another program offered by We Engage 4 Health. Our website (https://weengage4health.life/) has more information about WE4H RAP programs.

Our WE4H Eyewitness Community Survey (ECS) is an online tool to support community citizen science projects. Middle schoolers to adults are invited to partner with the WE4H scientific team to make and record observations in their own communities using their mobile devices. Citizen Scientists prepare by watching three engaging, graphic-style, story-focused training videos explaining how citizen science can be used to understand the impact of local environments on community health. After viewing the videos, participants take a short knowledge and self-efficacy quiz and practice. They are then ready to record observations. The data is analyzed, and photos are geomapped and can be used by the group to fuel discussions and plan new studies or interventions. Pilot testing has been completed and analysis of reliability and validity data was presented. Focus group discussions overall confirmed that the training stories/videos were informative and well received although downloadable talking points and/instructions were suggested additions; the ECS was overall easy to use, however, additional branching logic would minimize unnecessary questions generated based on earlier responses. WE4H will now partner with a community group seeking to measure heat islands and related air pollution in their community to consider how these might be impacting their residents' health. Story maps will inform design decisions to begin to remedy challenges identified



Strategies to Leverage the Expertise of Your Advisory Board

PRESENTERS:
ANASTASIA THANUKOS, PHD, PRINCIPAL EDITOR, UC MUSEUM OF PALEONTOLOGY UC BERKELEY
ALEX GURN, PHD, RESEARCH ASSOCIATE, ROCKMAN ET AL

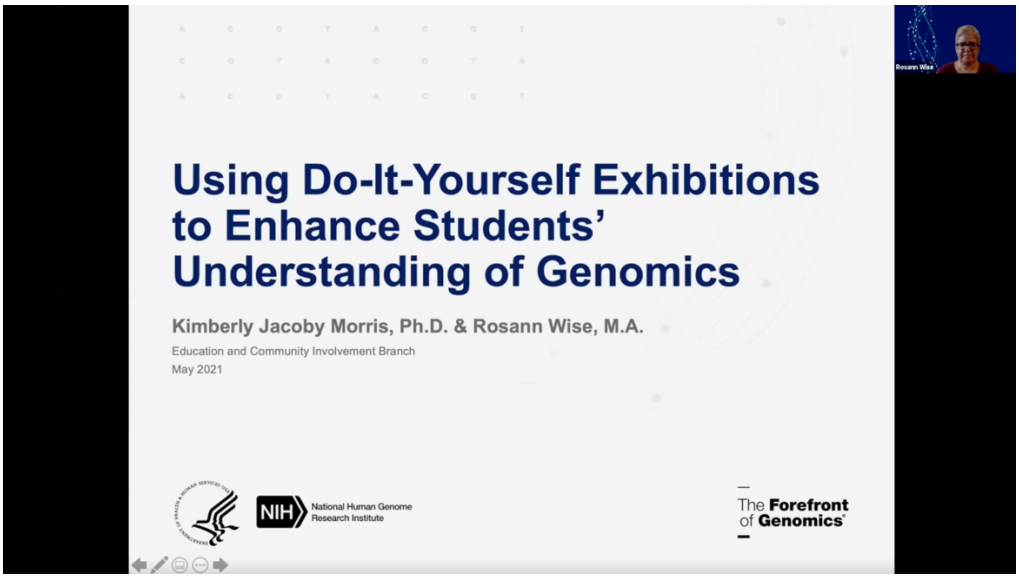
NIH-funded projects commonly utilize an advisory board to provide independent feedback on the project's progress, outcomes, and broader impacts. In this session, we explored project design considerations, team selection, engagement strategies, collaborative practices, and other factors that can enable or inhibit the effectiveness of advisors to constructively inform the initiative. We shared our experience with the SEPA project STEM Escape. The project ensured buy-in from advisors by engaging them with a project-relevant team experience, demonstrating leadership's commitment to the project, and communicating the impact advisors had in shaping the project. It also employed practical, on-the-ground working strategies to obtain advisor input. These include using a "flipped" meeting format to maximize productive interactions during meetings, targeted techniques for achieving equitable input among advisors and efficiently using meeting time, while staying true to the project's vision. Other organizational strategies employed included clearly communicating expectations and decision-making, building rapport, and understanding among advisors from different disciplines, developing a minimal viable product before seeking input from advisors, and capitalizing on advisors' own interests and passions. We also discussed the various roles advisors have during the different stages of a project's lifecycle, from vision to product and dissemination. Breakout session participants engaged with Zoom whiteboard activities to elicit their ideas, which included valuable strategies such as targeting advisor tasks to expertise and interest, having advisors do "user" testing, one-on-one consultations, rotating advisors on and off the panel, and incorporating data parties, hands-on activities, and games.

Using DiY Exhibitions to Enhance Student's Understanding of Genomics

PRESENTERS:
KIMBERLY JACOBY MORRIS, PHD, EDUCATION SPECIALIST, NATION HUMAN GENOME RESEARCH INSTITUTE
ROSANN WISE, MA, PROGRAM ANALYST, NATIONAL HUMAN GENOME RESEARCH INSTITUTE

Genetics and genomics are complex topics that are essential components of the rapidly advancing healthcare field. It is crucial to engage K16 students and provide opportunities for education in accessible forms of communication. Evolving from the traveling exhibition, Genome: Unlocking Life's Code, a DIY Pop-Up exhibition was created in partnership with the National Museum of Natural History. We presented a framework where students can improve knowledge about the foundations of genetics and genomics through pop-up panels and then create their own customizable panel for exhibition. This unique opportunity allows students to practice their literature research skills and scientific communication, which ultimately improves their genomic literacy. The customization could inspire students to grow into socially conscious health leaders who promote equity for their communities. The presenters provided an historical overview of the traveling exhibition Genome: Unlocking Life's Code. This project created the foundation for the DiY exhibition. They also covered content generation, communicating science and the adaptability required for educational interactives. Participants were particularly interested in the comprehensive coverage of career possibilities in non-traditional spaces for STEM degrees and in dissemination logistics and identifying venues in which the panels could be displayed.

Genome DIY https://naturalhistory.si.edu/exhibits/diy/genome.



Participants:

Carmela Amato-Wierda, University of New Hampshire
Amir Attia, California State University, Monterey Bay
Marie Barnard, University of Mississippi
Kristin Bass, Rockman Et Al
Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Luke Bradley, University of Kentucky
Loretta Brady, Saint Anselm College
Karen Burns-White, Dana-Farber/Harvard Cancer Center
Rebecca Carter, Seattle Children's Research Institute
Ellen Chenoweth, University of Alaska Southeast
Jamie Cornish, Montana State University
Ido Davidesco, University of Connecticut
Martina Efeyini, University of Maryland, Baltimore
Michelle Ezeoke, Georgia State University
Jenica Finnegan, University of Nevada, Reno
Adrianne Fisch, Purdue University
Katharina Furrs, University of Maryland, Baltimore
Josh Gifford, Southern Illinois University Edwardsville
Ella Greene-Moton, University of Michigan
Ben Greenfield, University of Southern Maine
David Holben, University of Mississippi
Megan Keniry, The University of Texas Rio Grande Valley
Ann Lambert, University of Utah
Rafael Leite, University of Miami
Teresa MacDonald, University of Kansas
Anna Marsden, University of Utah
Lindley McDavid, Purdue University
Katherine McMillan-Culp, New York Hall of Science
Kauionalani Mead, Hawaii/Pacific Basin Area Health Education Center
Jasmina Mesic, FoodMASTER
Catherine Morton, West Virginia University
Bruce Nash, Cold Spring Harbor Laboratory
Cecilia Nguyen, Oregon Museum of Science and Industry
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
Emaly Piecuch, The Jackson Laboratory
Matt Queen, Montana State University Billings
Alicia Santiago, Twin Cities Public Television
Jyoti Singh, NIH/NIGMS
Kim Soper, University of Nebraska Medical Center
Laura Tenenbaum
Abbey Thompson, The Tech
Amy Warren, NorthWest Arkansas Community College
Lisa White, University of California, Berkeley
James Wong, The Tech

Themed Session: Teacher Professional Learning

Wednesday, May 26, 2021 – 3:00 PM – 4:00 PM

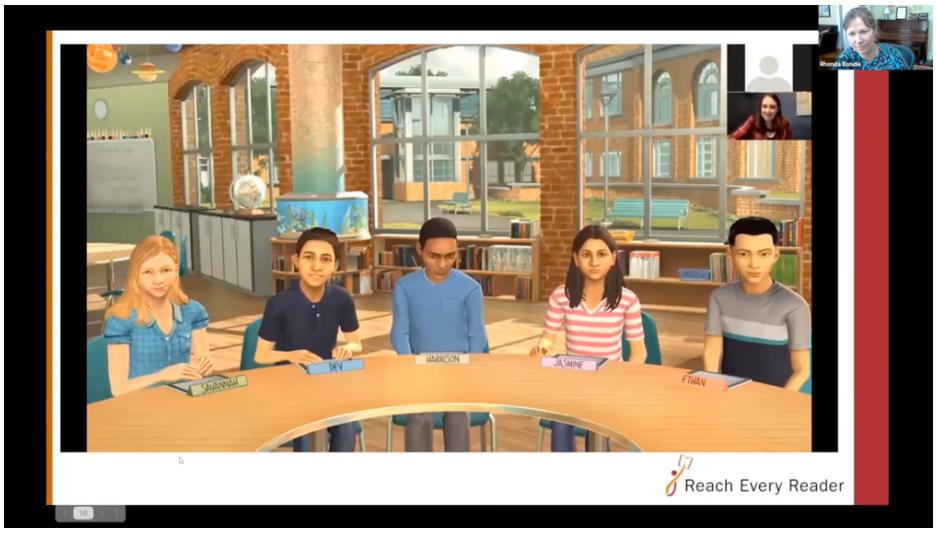
Transforming Field Experiences in Teacher Preparation through Personalized, Mixed Reality Simulations

PRESENTERS:

CHRISTOPHER DEDE, EDD, TIMOTHY E. WIRTH PROFESSOR IN LEARNING TECHNOLOGIES, TECHNOLOGY, INNOVATION, AND EDUCATION PROGRAM, HARVARD UNIVERSITY

RHONDA BONDIE, PHD, LECTURER ON EDUCATION, GRADUATE SCHOOL OF EDUCATION, HARVARD UNIVERSITY

Dr. Bondie and Dr. Dede described a technique for enhancing teacher preparation called "Digital Puppeteering" as part of their Reach Every Reader Program. Digital puppeteering takes place on a platform created by the Mursion company and involves digital simulations of classrooms wherein digital students are "puppeteered" by live actors to more accurately reproduce students in a classroom. This platform is used to enhance teacher's real-world teaching practice by getting real-time feedback. Using David Perskin's tree and flower analogy, teachers can practice reaching higher-level student learning by engaging with the simulated students. Digital classroom simulations are recorded, and teacher classroom engagement can be analyzed using algorithms designed to identify specific elements of teacher responses. Both new and experienced teachers can enhance their practice, and the research has found that many experienced teachers were able to unlearn some of their learned behaviors and new teachers can establish quality practice to bring into real-world classrooms. This technology can be used to provide teachers transformational insights to refine their practice. Session participants asked questions about the teacher assessment algorithms and potential applications for various programs.



The Evolution of Online Teacher PD: Before, During, and Into the Future

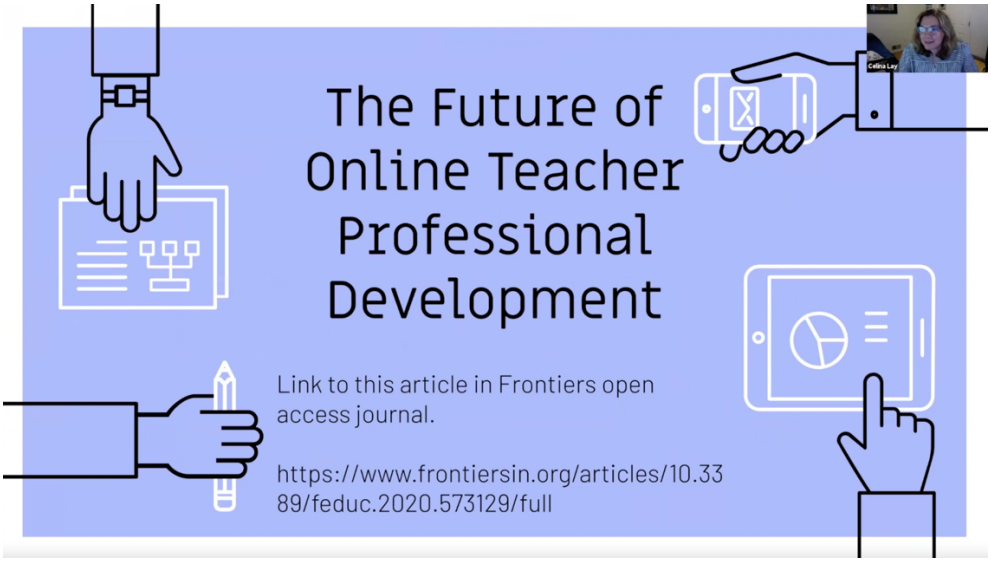
PRESENTERS:
ATOM LESIAK, PHD, DIRECTOR, GENOME SCIENCES EDUCATION OUTREACH, UNIVERSITY OF WASHINGTON
JOAN GRISWOLD, MS, PROGRAM MANAGER, GENOME SCIENCES EDUCATION OUTREACH
HELENE STARKS, ASSOCIATE PROFESSOR OF BIOETHICS AND HUMANITIES, UNIVERSITY OF WASHINGTON SCHOOL OF MEDICINE

The presenters discussed their GEMNet program provides teacher professional development (PD) for Health, Family and Consumer Science, and Biology teachers for the intersecting curriculum on Type 2 Diabetes. In January 2020, the GEMNet program offered their first online teacher PD after noting inequitable access to their PD sessions from teachers who lacked resources to attend. They noted time, money, travel distance and costs, childcare, and health and ability limitations. Online PD is much more accessible to teachers because it allows for flexibility with time and location. GEMNet described their asynchronous course set-up, which allows for teachers to engage with the course materials between live in-person sessions. The live online sessions then allow for maximal teacher engagement, with facilitators and other teachers, to discuss the curriculum. During 2020-21 the GEMNet team has provided online teacher PD to 43 teachers during eight different online sessions, and compiled teacher feedback from these sessions. Major takeaways identified the struggle with technology, and how teachers generally appreciated online PD, especially live online discussions about curriculum, and being able to meet with other teachers.

Examining a Decade of Online Teacher Professional Development

PRESENTER:
CELINA MARIE LAY, PHD, INSTRUCTOR IN TEACHER EDUCATION, BRIGHAM YOUNG UNIVERSITY

Dr. Lay provided insights from her literature review article and highlighted the work of 73 different research studies on the effectiveness of online professional development (PD). She found that online teacher PD has many advantages, particularly with respect to accessibility and access for teachers. In-person PD prioritizes teachers with geographical proximity to the event, along with the time and money needed to access it. Dr. Lay described ways in which online PD is as effective as in-person PD, but also discussed how more, well-controlled and rigorous empirical research studies are needed. Research in online PD is moving forward in more sophisticated ways and adding to our understanding of high-quality practices that engage teachers in meaningful ways. Dr. Lay highlighted the ways in which the rapid switch to online PD during the pandemic has helped encourage more programs to create online PD opportunities.



Participants:

Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Liliana Bronner, University of Nebraska Medical Center
Deanna Buckley, University of Texas at Austin
Manetta Calinger, Wheeling Jesuit University
Jeanne Chowning, Fred Hutchinson Cancer Research Center

Carol Colaninno, Southern Illinois University Edwardsville
Jocelyn Dixon, East Carolina University
Dina Drits-Esser, University of Utah
Sara Erickson, Iowa State University
Adrianne Fisch, Purdue University
Barbara Hug, University of Illinois Urbana-Champaign
Larry Johnson, Texas A&M University
Anna Marsden, University of Utah
Allison McQueen, Tuft University
Kim Soper, University of Nebraska Medical Center
Virginia Stage, East Carolina University
Gwendolyn Stovall, University of Texas at Austin
Amy Warren, NorthWest Arkansas Community College
Charles Wood, Wheeling University
Regina Wu, Fred Hutchison Cancer Research Center

Themed Session: Science Teaching and Learning

Wednesday, May 26, 2021 – 3:00 PM – 4:00 PM

Chew on This: Obstacles and Successes for Using Food to Teach Chemistry Online

PRESENTERS:
TANDY L DOLIN PETROV, MS, MA, SCIENCE EDUCATOR AND PHD STUDENT, CENTER FOR COMMUNITY OUTREACH DEVELOPMENT, UNIVERSITY OF ALABAMA AT BIRMINGHAM
STANISLAV V PETROV, BS, SCIENCE EDUCATOR, CENTER FOR COMMUNITY OUTREACH DEVELOPMENT
RETTA R EVANS, PHD, CENTER FOR COMMUNITY OUTREACH DEVELOPMENT
J. MICHAEL WYSS, PHD, CENTER FOR COMMUNITY OUTREACH DEVELOPMENT

Tandy Petrov of the Center for Community OutReach Development's FoodMASTER education presented on behalf of their team. She described the quick switch from in-person learning to a blended online/virtual learning experience for rising 3rd-8th grade scholars when Covid-19 closed many summer learning institutes. Ms. Petrov discussed the challenges in creating additional learning supports to enhance the FoodMASTER curriculum, as well as understanding how to use appropriate online platforms to host an engaging learning camp experience. Additionally, she summarized how to assemble safe, cost-effective kits for campers to use at home to participate in hands-on experiments using food. She discussed the need for scholars to learn how to apply basic math and science skills using food to understand the principles of chemistry and the supports and scaffolds needed to ensure that gaps in knowledge are bridged. The team was also interested in the perception and attitudes of students after they completed the lab, therefore Ms. Petrov shared the Likert-style survey they used. The audience engaged with the presenter by asking questions about how to create and budget for kits, where to find enough money for the supplies, as well as how to choose which labs and methods are effective and easily implemented online for all students. Lastly, Mrs. Petrov described their future directions for using food to teach chemistry online as well as in-person using the FoodMASTER curriculum. This included highlighting successful labs as well as limitations and caveats for teaching chemistry virtually using food and sustaining science safety at home. Overall, the summer science camp was well-received by the scholars and the team is planning a 9-day in-person summer science food chemistry camp for July 2021.

Enhancing Cancer Literacy in Kentucky High School Students through Cancer Education

PRESENTER:
LAUREN HUDSON, BS, MARKEY CANCER CENTER, UNIVERSITY OF KENTUCKY

The Appalachian region of Kentucky produces the highest cancer incidence and mortality rates in the country. This disparity is worsened by high tobacco use, obesity rates, and poverty levels. Furthermore, low health care literacy leads to decreased health care engagement, thus increasing the cancer rates. University of Kentucky senior, Lauren Hudson, discussed this disparity and detailed a study attempting to increase cancer education in the region.

The study implemented a cancer education intervention for Kentucky middle and high school students. This intervention included a 10-question pretest, a cancer-related presentation, an immediate posttest, and a three-month follow-up survey. The results showed improved cancer knowledge via an increased number of correct responses. Furthermore, the data demonstrated that students are willing to share their newfound cancer knowledge with others. Similar studies completed in different populations display comparable conclusions.

Following the analysis of the results, the presentation shifted to a discussion including conference attendees. Using a Mentimeter poll, Hudson asked participants to provide one- to three-word responses about what topics cancer education curriculum for middle/high schoolers should cover. Participants said curriculum should be interactive and cover themes like screening, prevention, and causes.

Hudson then described how she and a team of researchers at the Markey Cancer Center at the University of Kentucky created lessons designed to be incorporated into science/health classrooms. These three lessons teach students about cancer basics, risk factors/modifiable behaviors, and cancer treatment. Each lesson is culturally tailored to Appalachian middle/high school students and includes a PowerPoint presentation, in-class activities, and a teacher's guide. Such curriculum could aid in lowering Kentucky cancer rates, especially in the Appalachian region of the state. Future research will attempt to integrate the curriculum into schools for the 2021-2022 school year and receive feedback from teachers and students as to the curriculum's effectiveness.

Participants:

Alison Allen, Rockman Et Al
Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Renee Boney-Jett, University of Minnesota
Holly Brown, Walter Reed Army Institute of Research

Karen Burns-White, Dana-Farber/Harvard Cancer Center
Desmond Campbell, Vanderbilt University
Donna Cassidy-Hanley, Cornell University
Melani Duffrin, Northern Illinois University
Adrianne Fisch, Purdue University
Josh Gifford, Southern Illinois University Edwardsville
Kymberly Grantham, Georgia State University
Sheila Homburger, University of Utah
Berri Jacque, Tufts University
Suzanne Kirk, Virginia Commonwealth University
Shrawan Kumar, University of Nebraska Medical Center
Atom Lesiak, University of Washington
Dina Markowitz, University of Rochester
Julia McQuillan, University of Nebraska – Lincoln
Jasmina Mesic, FoodMASTER
Osvaldo Morera, University of Texas, El Paso
Kevin Phelan, University of Arkansas for Medical Sciences
Jyoti Singh, NIH/NIGMS
Kim Soper, University of Nebraska Medical Center
Brittany Swift
Jen Taylor, University of Utah
Nathan Vanderford, University of Kentucky
Melinda VanDevelder, Virginia Commonwealth University
Michele Ward, Texas A&M University
Torri Whitaker, Texas A&M University

Keynote Address:

Thursday, May 27, 2021 – 11:00 AM – 12:00 PM

Leading the Way to a Modern Data Ecosystem: Stories of Women and Men Making an Impact in Data Science at NIH

SUSAN GREGURICK, PHD, NIH ASSOCIATE DIRECTOR FOR DATA SCIENCE AND DIRECTOR, OFFICE OF DATA SCIENCE STRATEGY, NIH OFFICE OF DATA SCIENCE STRATEGY

A self-proclaimed "closet geek," Dr. Gregurick shared her journey from childhood to her current career at NIH. She also highlighted NIH scientists who are working together to advance data science. She not only talked about their scientific research but shared their hobbies and interests outside of the laboratory. These individuals included:

- Dr. Laura Biven, who studies artificial intelligence and works with teams across NIH. She visited China (a life-long dream) when she was bumped from a transatlantic flight and received a free round-trip ticket to anywhere in the world.
- Dr. Jenny Larkin, who develops programs and policies for data repositories to work together. She's also an active dog trainer in obedience and agility.
- Dr. Alissa Dillman, who is committed to engaging the public in data science. She runs data science training programs for teachers and women-led codeathons. Outside of NIH, she has

been a hair model for an annual Hair Wars show. She's been styled as Alice in Wonderland, an 80's punk rocker, and the comic character Wolverine.

Dr. Gregurick encouraged young people to seek mentors, take risks, and never stop learning. During the question-and-answer period, she noted that it was never too early to get children interested in data science. In fact, other countries introduce it before kindergarten. One option would be to embed data science into existing engagement activities to encourage young learners.

Concurrent Breakout Sessions:

Thursday, May 27, 2021 – 12:00 PM – 1:00 PM

Increasing Youth Voice and Choice: A Toolkit for Recruiting and Retaining "Hard to Reach" Youth in Informal Science Education

FACILITATORS:

LAURIE JO WALLACE, MA, MANAGING DIRECTOR, HEALTH RESOURCES IN ACTION

BRANDON MORGAN, MA, PROGRAM ASSOCIATE, LEAH KNOX SCHOLARS, HEALTH RESOURCES IN ACTION

LISA ASLAN, MA, DIRECTOR, LEAH KNOX SCHOLARS, HEALTH RESOURCES IN ACTION

This session was facilitated by staff from the LEAH Knox Scholars (LKS), a biomedical research program designed to expose youth underrepresented in research fields to molecular biology and biomedical research pathways. Given the challenges to engaging and retaining underrepresented youth in STEM programs, the LEAH Project employs a youth development approach that underpins its informal STEM education. The objective of this workshop was to share some of these youth development-based strategies with SEPA participants to bolster recruitment and retention.

The workshop defined levels of youth engagement and helped participants explore how they can employ youth development strategies in their programs to increase engagement and retention. Using the LEAH Knox Scholars program as an example, facilitators provided concrete strategies for increasing youth voice and choice in programming and demonstrated how high levels of youth engagement can be used as a retention tool for youth typically underrepresented in STEM fields (first generation college students, low-income youth) while also helping to build skills that will enable youth to succeed in STEM fields.

Participants were able to think divergently both in large group and small group settings about their own approaches to recruiting and retaining youth. They also were able to brainstorm strategies that would assist in recruitment efforts. Many participants cited the COVID-19 pandemic as a challenge in recruitment, but they were also able to think divergently about opportunities to reach vulnerable populations through virtual programming.

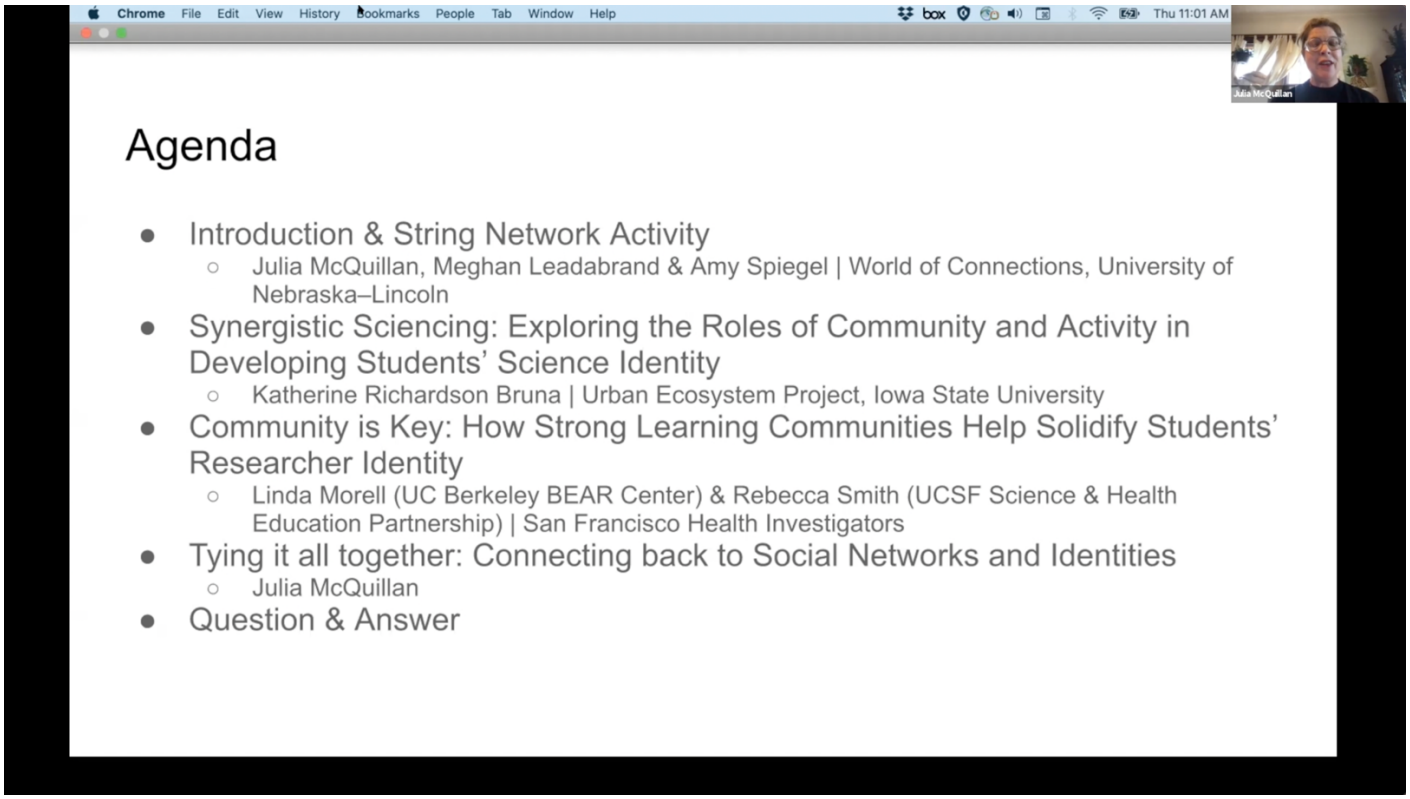
Participants:

Carmela Amato-Wierda, University of New Hampshire
TaShara Bailey, University of Maryland Baltimore
Renee Boney-Jett, University of Minnesota
Luke Bradley, University of Kentucky
Liliana Bronner, University of Nebraska Medical Center
Holly Brown, Walter Reed Army Institute of Research
Manetta Calinger, Wheeling Jesuit University
Jamie Cornish, Montana State University
Martina Efeyini, University of Maryland, Baltimore
Michelle Ezeoke, Georgia State University
Jenica Finnegan, University of Nevada, Reno
Adrianne Fisch, Purdue University
Maurice Godfrey, University of Nebraska Medical Center
Becky Gonda, University of Pittsburgh
Ben Greenfield, University of Southern Maine
Alex Gurn, Rockman Et Al
Susan Hershberger, Miami University
David Holben, University of Mississippi
Regina Idoate, University of Nebraska Medical Center
Manuela Jaramillo, University of Miami
Neil Lamb, HudsonAlpha Institute for Biotechnology
Teresa MacDonald, University of Kansas
Emily Mathews, Northwestern University
Katherine McMillan-Culp, New York Hall of Science
Kauionalani Mead, Hawaii/Pacific Basin Area Health Education Center
David Micklos, Cold Spring Harbor Laboratory
Sandra San Miguel, Purdue University
Osvaldo Morera, University of Texas, El Paso
Megan Morrone, Rockman Et Al
Cecilia Nguyen, Oregon Museum of Science and Industry
Elizabeth Parker, University of Maryland, Baltimore
Loran Parker, Purdue University
Sarah Praskievicz, The University of North Carolina at Greensboro
Anja Scholze, The Tech
Tomekia Simeon, Dillard University
James Skeath, Washington University in St Louis
Valerie Solon, Tufts University
Abbey Thompson, The Tech

Amy Warren, NorthWest Arkansas
Community College
Sequoia Wright, University of Maryland,
Baltimore

Social Networks, Community, and Students' Identities

FACILITATOR:
REBECCA SMITH, PHD, CO-DIRECTOR, UCSF SCIENCE & HEALTH EDUCATION PARTNERSHIP
PANELISTS:
JULIA MCQUILLAN, PHD, WILLA CATHER PROFESSOR OF SOCIOLOGY, UNIVERSITY OF NEBRASKA LINCOLN
KATHERINE RICHARDSON BRUNA, PHD, PROFESSOR, IOWA STATE UNIVERSITY
LINDA MORELL, PHD, RESEARCHER, UC BERKELEY, BEAR CENTER
MEGHAN LEADABRAND, UNIVERSITY OF NEBRASKA LINCOLN



Continuing the theme of personal identity from the SciEd Keynote "Leading the Way to a Modern Data Ecosystem: Stories of Women and Men Making an Impact in Data Science at NIH," the breakout session "Social Networks, Communities, and Students' Identities" explored the interplaying roles of social networks, community building, and students' numerous personal identities in shaping students' researcher / science identities. Julia McQuillan (University of Nebraska–Lincoln SEPA PI) began the session with an introduction and a warm-up activity—"String Network"—that revealed the many (often unseen) ways in which participants are connected. For example, several session participants, who may or may not know each other personally, were linked by their shared identities as science educators. We did not have time to create a network map of session participant responses during the session, so we showed an example of a network model

with leader responses. There was a useful discussion in the chat about how others might find a way to do a quick conversion of responses in a google sheet into a map. Next, Katie Bruna (Iowa State University SEPA PI) discussed "synergistic sciencing" in the Urban Ecosystem Project and how she uses cultural-historical activity theory to reflect on interactions among participants. As part of the project, youth and pre-service educators attended a summer camp where they participated in a shared activity around science tool use facilitated by a community building activity around identities. Youth participants who shared their talents helped to build community and trust for youth to take risks in the "science" part of the camp. Finally, Rebecca Smith (University of California–San Francisco) and Linda Morell (University of California–Berkeley) provided an overview of the San Francisco Health Investigators program and the development of a researcher identity survey that they constructed. Iterative use of the survey revealed that adding more activities to increase a sense of belonging led to stronger learning communities that helped solidify students' researcher identities. McQuillan ended the formal presentations by reporting how "franchising" NE STEM 4U informal clubs from Omaha to Lincoln involved revealing assumptions about community partners and resources. We learned that leadership training of mentors needed to explicitly focus on building community among the mentors and mentees to create an effective and positive club learning culture. There was a lively discussion among the attendees.

Participants:

TaShara Bailey, University of Maryland Baltimore
Robin Bartlett, University of Alabama
Asa Bradman, University of California Merced
Karin Chang, University of Missouri- Kansas City
Jose Chavero Rivera, Baylor College of Medicine
Dina Drits-Esser, University of Utah
Elizabeth Edmondson, Virginia Commonwealth University
Adrianne Fisch, Purdue University
Marnie Gelbart, Harvard Medical School
Jacqueline Genovesi, Drexel University
Melinda Gibbons, University of Tennessee, Knoxville
Ben Gorski, University of Maryland Baltimore
Larry Johnson, Texas A&M University
Lisa Marriott, Oregon Health & Science University
Allison McQueen, Tuft University
Alana Newell, Baylor College of Medicine
Carla Romney, Boston University
Patrice Saab, University of Miami
Amy Spiegel, University of Nebraska – Lincoln
Louisa Stark, University of Utah
Anastasia Thanukos,
Demetrius Trundle, Twin Cities PBS
Karen Yanowitz, Arkansas State University

Overcoming Barriers and Creating a Sense of Belonging in Student Research Experiences

FACILITATOR:
DAVE VANNIER, PHD, HIGH SCHOOL & PATHWAYS UNDERGRAD INTERNSHIPS, FRED HUTCHINSON CANCER RESEARCH CENTER
PANELISTS:
ELLEN CHENOWETH, PHD, PROGRAM DIRECTOR, RASOR, UNIVERSITY OF ALASKA SOUTHEAST
DAVID BOONE, PHD, DIRECTOR, HILLMAN ACADEMY, UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE

This interactive session addressed the following two questions:

1. How do you foster scientific identity and a sense of belonging among the participants in your research experience program?
2. What partnerships, technologies and/or resources have helped enable a sense of belonging?

The three presenters – Dave Vannier, Ellen Chenoweth, and David Boone – shared experiences from our individual NIH-funded programs. We then broke into three groups where participants shared their experiences.

Nearly all of us have summer programs, and we agreed to touch base in mid-September to see how it went. Participants were from St Jude's, Northern Illinois University, MIT, University of Maryland, University of Texas, Cal State Monterey Bay, and El Paso Community College. Based on email correspondence in weeks after the session, it looks like we've established connections between a number of the groups.

Small-group discussion yielded the following results:

How do you foster scientific identity and a sense of belonging among the participants in your research experience program?

- Multiple levels of mentorship – peer-peer mentors, near-peer mentors, etc.
- Expose students to researchers from diverse backgrounds – this includes mentors, speakers, journal authors
- Tailor research experiences to student interests (give students a choice)
- Tell the full story of research – experiments fail most of the time
- Provide multiple platforms for students, mentors, and researchers to communicate

What partnerships, technologies and/or resources have helped enable a sense of belonging?

- Local partners - CBOs, local foundations, school districts, learning ecosystems, MSIs, HBCUs
- Finding and establishing partnerships with local community advocacy groups – including sustainability
- Large-scale citizen science projects
- Lots of opportunities for contributions from all students – Discord, yes, JamBoard, Google Slides (aka "living slide deck"), and other social media platforms.
- Scientist Spotlights series by Kimberly Tanner: https://scientistspotlights.org/

Participants:

Alison Allen, Rockman Et Al
Maria Alvarez, El Paso Community College
Carmela Amato-Wierda, University of New Hampshire
Kate Ayers, St Jude Children's Research Hospital
TaShara Bailey, University of Maryland Baltimore
Rubin Baskir, NIH

Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Julie Bokor, University of Florida
Adrianne Fisch, Purdue University
Mary Larson, Salish Kootenai College
Jasmina Mesic, FoodMASTER
Elizabeth Parker, University of Maryland, Baltimore
Misty Pocwierz-Gaines, University of Nebraska Medical Center
Natalia Podlutskaya, University of Alaska Southeast
Enid Rycw, California State University, Monterey Bay
Mandana Sassanfar, Massachusetts Institute of Technology
Janice Straley, University of Alaska Southeast
Gwendolyn Stovall, University of Texas at Austin
Anne Westbrook, BSCS Science Learning
Lisa White, University of California, Berkeley
J. Michael Wyss, University of Alabama at Birmingham

Program Sustainability: Successes and Challenges – Session 1

FACILITATOR:
CARLA ROMNEY, DSC, DIRECTOR OF RESEARCH, CITYLAB, BOSTON UNIVERSITY SCHOOL OF MEDICINE
PANELISTS:
DEBRA YOURICK, PHD, DIRECTOR, SCIENCE EDUCATION AND FELLOWSHIP PROGRAMS, WALTER REED ARMY INSTITUTE OF RESEARCH
KELLEY WITHY, MD, PHD, PROFESSOR AND DIRECTOR, HAWAII/PACIFIC BASIN AREA HEALTH EDUCATION CENTER, UNIVERSITY OF HAWAII/JOHN A. BURNS SCHOOL OF MEDICINE
MELISSA GILLIAM, MD, MPH, VICE PROVOST AND PROFESSOR OF OBSTETRICS AND GYNECOLOGY AND PEDIATRICS, UNIVERSITY OF CHICAGO
RALPH IMONDI, PHD, EXECUTIVE DIRECTOR, COASTAL MARINE BIOLABS INTEGRATIVE BIOSCIENCES INSTITUTE

The presenters shared the following approaches for building program sustainability:

- Provide course credit as inducement for participation
- Obtain funding from multiple funding sources (NSF, HHMI, private philanthropy, state and local government and tribal organizations)
- Charge students to visit the facility where curriculum is taught

- Develop non-SEPA programming that is designed to bring in money and use funds to support SEPA activities
- Maintain positive and supportive relationships with partners and evaluators (even when plans change)
- Keep institutional leadership aware of program/progress/challenges/impact
- Cultivate new partners (in case some disappear during tough times)
- Change the SEPA focus with successive applications based on available partners and local ecosystem
- Build your own lab/research/program space to reduce dependence on university and others
- Train teachers and have them run workshops to enhance dissemination and promote uptake of materials
- Create a for-profit entity and sell products as kits for teachers- eligible for SBIR funding; need licensing agreement with university for SEPA-created materials if SEPA grant was to a university
- Divide the labor among the leadership team; build for sustainability in case one person leaves/moves on
- Partner with other organizations (i.e., Challenger centers)
- Need increase in annual SEPA budget to pay for more senior personnel effort

Participants:

Bianca Alexander, Michigan State University
TaShara Bailey, University of Maryland Baltimore
Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Melani Duffrin, Northern Illinois University
Adrianne Fisch, Purdue University
Carl Franzblau, Boston University
David Garcia, Washington State University
Elizabeth Genne-Bacon, Tufts University
Ella Greene-Moton, University of Michigan
Dave Holben, University of Mississippi
Megan Keniry, The University of Texas Rio Grande Valley
Stephen Koury, University at Buffalo
Catherine Morton, West Virginia University
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
Kevin Phelan, University of Arkansas for Medical Sciences
Kim Soper, University of Nebraska Medical Center
Virginia Stage, East Carolina University
Brittany Swift
Laura Tenenbaum
Charles Wood, Wheeling University

Researchers, Teachers and Data: Oh My!

PRESENTER:
CONSUELO MORALES, PHD, RESEARCH ASSOCIATE, MICHIGAN STATE UNIVERSITY
FACILITATORS:
ROSEMARY RIGSS, PHD, RESEARCH EDUCATION OUTREACH SPECIALIST, TEXAS BIOMEDICAL RESEARCH INSTITUTE
RENEE BAYER, MHSA, ASSOCIATE DIRECTOR FOR ENGAGEMENT, CREATE FOR STEM INSTITUTE, MICHIGAN STATE UNIVERSITY

This session explored, experienced, and discussed teachers' and researchers' differing perspectives about data using the curricular unit "What Controls My Health?" This middle school unit investigates gene-environment interaction and its effect on human health through the phenomenon of Type-2-diabetes. The participants experienced "generating" data through the evaluation of authentic student data using a teacher rubric created from an embedded formative assessment item from the diabetes unit. Our session had a robust discussion about the rigorous process that went into building our assessments and the importance of such a rigorous process. Participants seemed particularly interested in this process as they thought about their own projects and how to assess students' knowledge around their own SEPA projects. There was also discussion about the importance of aligning the assessments with the three-dimensional Next Generation Science Standards because national testing would require students to demonstrate three-dimensional learning. In our sessions, participants also discussed the data literacy disconnects between researchers and teachers. Specifically, teachers might benefit from having a deeper understanding

of how to collect data, read and analyze data and then communicate their findings from data (such as through use of our embedded assessments and accompanying teacher rubrics). In this way, teachers could use actual data, rather than intuition, to guide their own teaching practices as well as better support student learning. Participants seemed to enjoy the interactive nature of the session which encouraged them to experience using some of our assessment and rubric tools and then discussing that experience in small groups as well as having whole group discussions. As presenters, we enjoyed the collaborative nature of the session, which brought together two different SEPA projects.

Participants:

TaShara Bailey, University of Maryland Baltimore
Rubin Baskir, NIH
Kristin Bass, Rockman Et Al
Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Julie Bokor, University of Florida
Elizabeth Edmondson, Virginia Commonwealth University
Adrianne Fisch, Purdue University
Joan Griswold, University of Washington
Dana Haine, University of North Carolina at Chapel Hill
Mary Kay Hickey, Cornell University
Dave Holben, University of Mississippi
Bethany Hornbeck, Apis Creative
William Pacetti, University of Miami
David Petering, University of Wisconsin-Milwaukee
Regina Wu, Fred Hutchison Cancer Research Center
Kristine Wylie, Washington University

Integrating Interactive Multimedia into Your Project

Facilitator:
Adam Hott, PhD, Digital Applications Lead, HudsonAlpha Institute for Biotechnology
Panelists:
Berri Jacque, PhD, Associate Professor, Tufts University
Danielle Alcéna-Stiner, PhD, RN, Assistant Director, Life Sciences Learning Center, Instructor of Clinical Nursing, University of Rochester
Sheila Homburger, MS, Science Content Manager, Genetic Science Learning Center, University of Utah

The goal of this session was to provide attendees with a discussion around the variety of types of multimedia that can be integrated into science education projects. Three presenters, Sheila Homburger, Berri Jacque and, Danielle Alcena-Stiner, were asked to share the types of multimedia projects currently being developed or that have been developed for these purposes. Much of the discussion after the short presentations was centered on what constitutes interactive multimedia. Points about how interactive multimedia included both simple interactive diagrams and much more complex game-based systems was included with pros and cons for each. One of the most

discussed topics was on budgets for including interactive multimedia. The suggestion of building in less funding for these products early in a grant cycle was made. This went along with the suggestion that paper prototyping was a cheap and very important step in designing interactive multimedia. A lively discussion on what platform to create for and how to best achieve multiplatform interoperability was had. Suggestions on using programs like Unity and languages like HTML5 were made to serve this purpose, but the consensus seemed to be that starting with a web-based platform was best for those who were just starting to think about integration of multimedia. Native apps for phone and tablets are slowly becoming more difficult to manage and update. Funding interactive multimedia projects came up as well. Suggestions of how to scope the work, personnel needed, choose between in-house or contract work, and specific funding opportunities were all made. This included both NIH and private funding sources.

Participants:

Amir Attia, California State University, Monterey Bay
Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Donna Cassidy-Hanley, Cornell University
Jose Chavero Rivera, Baylor College of Medicine
Donald DeRosa, Boston University
Dina Drits-Esser, University of Utah
Nico Ekanem, Walter Reed Army Institute of Research
Kristin Fenker, University of Utah
Adrianne Fisch, Purdue University
Katharina Furrs, University of Maryland, Baltimore
Kymberly Grantham, Georgia State University
Renee Hesselbach, University of Wisconsin – Milwaukee
Tania Jarosewich, Censeo Group
Larry Johnson, Texas A&M University
Brinley Kantorski, Partnerships in Prevention
Travis Kelleher, Baylor College of Medicine
Suzanne Kirk, Virginia Commonwealth University
Molly Malone, University of Utah
Dina Markowitz, University of Rochester
Lisa Marriott, Oregon Health & Science University
Cynthia Nazario-Leary, University of Florida
Carlos Penilla, University of California San Francisco
David Petering, University of Wisconsin-Milwaukee
Emaly Piecuch, The Jackson Laboratory
Carla Romney, Boston University
Jen Taylor, University of Utah
Anastasia Thanukos, University of California, Berkeley
Anne Westbrook, BSCS Science Learning
Torri Whitaker, Texas A&M University
Lisa White, University of California, Berkeley
Sarah Will, Partnerships in Prevention
Charles Wray, The Jackson Laboratory

Concurrent Breakout Sessions:

Thursday, May 27, 2021 – 2:00 PM – 3:00 PM

Partnership Stories: Diverse Perspectives on Participatory Research and Design with Underrepresented Communities

Facilitator and Presenter:

Molly L. Kelton, Ph.D., Assistant Professor of Mathematics Education, Washington State University

Panelists:

Robert Danielson, PhD, Assistant Professor of Educational Psychology, Washington State University

Kristin Fisher, MS, PhD Student, Washington State University

David Garcia, MEd, Assistant Dean for Health Equity and Inclusion, Washington State University

Marnie Gelbart, PhD, Director of Programs, Personal Genetics Education Project, Harvard Medical School

Libby Grace, Teaching Assistant, Washington State University

Regina Idoate, PhD, Assistant Professor of Health Promotion, University of Nebraska Medical Center

Sharon Locke, PhD, Associate Professor and Director of the STEM Center, Southern Illinois University

AnaMaria Diaz Martinez, PhD, Associate Professor of Human and Family Development, Regional Specialist, Washington State University Extension

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

Alison White, MEd, Extension Regional Specialist, Washington State University

This session brought together researchers across five different institutions to discuss various efforts in participatory approaches to science program design and associated educational research. The session drew on narrative as a central format for exchanging stories and lessons learned related to participatory research and design. The session coordinator, Dr. Molly Kelton, began with an introduction to participatory approaches in science education and the learning sciences as well as the role of narrative in equity-oriented work in education. Each of the five participating institutions then gave short presentations on successes, challenges, and insights related to participatory approaches. The five projects included (1) a participatory design professional development program from Washington State University's HEAL project, (2) an environmental photovoice youth program based at Southern Illinois University, (3) a project involving co-designing an ASL-centric public science engagement platform for learners who are deaf or hard of hearing, based out of Harvard Medical School, (4) participatory research on skin cancer through an internship program

focused on Native American communities connected to the University of Nebraska Medical Center, and (5) co-design efforts using community advisory boards from diverse communities served by the University of Utah. Following presentations, participants moved into smaller breakout rooms to discuss the following questions: (1) What stories do you have of successes, challenges, and lessons learned related to participatory design and community partnership? (2) How can we create genuine science education partnerships with historically non-dominant communities? How can we navigate potential challenges, opportunities, and tensions that emerge from racial, linguistic, and academic differences? How can we attend to issues of power and hierarchy? (3) What are strategies for co-designing with multiple stakeholders effective, scientifically rigorous, and culturally responsive curriculum in a way that allows all collaborators to feel genuine authorship?

Participants:

Carmela Amato-Wierda, University of New Hampshire
TaShara Bailey, University of Maryland Baltimore
Rubin Baskir, NIH
Renee Bayer, Michigan State University
Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Loretta Brady, Saint Anselm College
Liliana Bronner, University of Nebraska Medical Center
Rochelle Cassells, University of Utah
Ellen Chenoweth, University of Alaska Southeast
Carol Colaninno, Southern Illinois University Edwardsville
Jamie Cornish, Montana State University
Ido Davidesco, University of Connecticut

Dina Drits-Esser, University of Utah
Kristin Fenker, University of Utah
Elizabeth Genne-Bacon, Tufts University
Ben Greenfield, University of Southern Maine
Susan Hershberger, Miami University
Megan Hochstrasser, University of California, Berkeley
David Holben, University of Mississippi
Barbara Hug, University of Illinois Urbana-Champaign
Tania Jarosewich, Censeo Group
Atom Lesiak, University of Washington
Lindley McDavid, Purdue University
Julia McQuillan, University of Nebraska – Lincoln
Elizabeth Parker, University of Maryland, Baltimore
Robyn Pennella, St. Jude Children's Research Hospital
Joyce Solheim, University of Nebraska Medical Center
Janice Straley, University of Alaska Southeast
Melinda VanDevelder, Virginia Commonwealth University

Game Design for Systems Thinking: Co-Creating Educational Interventions with Young People

PRESENTERS:
AILEA STITES, BS, YOUTH ENGAGEMENT LEAD, CI3 UNIVERSITY OF CHICAGO
MASON ARRINGTON, BS, GAME DESIGN DIRECTOR, CI3 UNIVERSITY OF CHICAGO
ADRIANA BRODY, MS, RESEARCHER, CI3 UNIVERSITY OF CHICAGO

The use of game-based interventions for STEM/health education among youth has both precedent and promise. Game-based learning offers interactive contexts for thinking through and experimenting with complex problems in a hands-on fashion. *Lineage* is a hybrid virtual-analog educational game, co-created with high school students. This theory-based game relates STEM and health careers to health disparities, aiming to increase diversity in STEM/health professions by connecting students' lived experiences to social determinants of health through game play. *Lineage* uses a Reproductive Justice lens to illustrate historic instances of injustice within the medical and scientific communities, increase students' self-efficacy around STEM/health topics, improve outcome expectations around their ability to enter STEM/health careers, and to effect systemic change.

In this interactive breakout session, we described Ci3's co-design methodology, explored the process of *Lineage's* creation, and discussed games as a youth-centered method, particularly how involving young people in the design process can lead to more youth-centered interventions.

Participants:

TaShara Bailey, University of Maryland Baltimore
Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Renee Boney-Jett, University of Minnesota
Asa Bradman, University of California Merced
Loretta Brady, Saint Anselm College
Tony Gao, Tufts University
Sheila Homburger, University of Utah
Adam Hott, Hudson, Alpha Institute for Biotechnology
Tania Jarosewich, Censeo Group
Brinley Kantorski, Partnerships in Prevention
Suzanne Kirk, Virginia Commonwealth University
Meghan Leadabrand, University of Nebraska, Lincoln
Kauionalani Mead, Hawaii/Pacific Basin Area Health Education Center
Julia McQuillan, University of Nebraska – Lincoln
Sandra San Miguel, Purdue University
William Pacetti, University of Miami
Kevin Phelan, University of Arkansas for Medical Sciences
Amy Spiegel, University of Nebraska – Lincoln
Sandra Stites, Kansas City Women's Clinic Group
Steve Stites, University of Kansas
Jen Taylor, University of Utah
Sarah Will, Partnerships in Prevention

Empowering Students with Environmental Health Research

PRESENTERS:

DAVID PETERING, PHD, ADJUNCT DISTINGUISHED PROFESSOR OF CHEMISTRY AND BIOCHEMISTRY, UNIVERSITY OF WISCONSIN MILWAUKEE

CRAIG BERG, PHD, PROFESSOR OF CURRICULUM AND INSTRUCTION, UNIVERSITY OF WISCONSIN MILWAUKEE

MICHAEL CARVAN, PHD, PROFESSOR OF FRESHWATER SCIENCES, UNIVERSITY OF WISCONSIN MILWAUKEE

DANIEL WEBER, PHD, STAFF EMERITUS, SCHOOL OF FRESHWATER SCIENCES UNIVERSITY OF WISCONSIN MILWAUKEE

RENEE HESSELBACH, MA, SEPA PROGRAM COORDINATOR, UNIVERSITY OF WISCONSIN MILWAUKEE

This breakout session provided attendees with a content-rich overview of our program, which concentrates on providing large numbers of high school students with authentic, hands-on research and research communication experiences. Teachers implement experiment modules in their classrooms that employ live organisms as model systems for understanding the consequences of exposure to chemicals. Within limits, students choose chemicals to investigate and then pursue questions of their own choosing about the impact of environmental chemicals on health. Upon completion, students assemble their results within research papers and posters for presentation at the annual Student Research Conference.

We described how the program transitioned from a hands-on to an online format during 2020-2021. The key features of the modules that were retained online were careful observation leading to data collection and analysis. In the module centering on the impact of chemicals on the neuromuscular activity of earthworms, two types of videos were produced, one describing in detail the experimental procedures utilized in the module and the other showing complete experiments with particular chemicals that students use to produce their own datasets. In contrast, for the study of chemical perturbation of zebrafish embryo development, a repository of thousands of images of zebrafish 0-96 hours post fertilization was made in which nicotine, caffeine, or ethanol concentrations were varied over several orders of magnitude. Students choose the image-sets for analysis and score each image for degree of anatomical and physiological integrity. Once data have been acquired, analysis and interpretation of results follows.

The Student Research Conference was offered asynchronously online this year. Presentations of papers were prerecorded; posters were uploaded onto the program Sway, for convenient viewing; and a WInSTEP-SEPA alumna provided students with an engaging talk about her journey from the program modules in high school to her undergraduate graduation in biochemistry with a view toward establishing a career as a research scientist.

Acknowledgement: this program was supported by NIGMS grant R25GM129191.

Participants:

Tony Beck, NIH/NIGMS Science Education Partnership Award (SEPA)
Victoria Coats, Oregon Museum of Science & Industry
Katharina Furrs, University of Maryland, Baltimore
Ben Greenfield, University of Southern Maine
Dana Haine, University of North Carolina at Chapel Hill
Barbara Hug, University of Illinois Urbana-Champaign
Tania Jarosewich, Censeo Group
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
Michael Pickart, Concordia University Wisconsin
Sarah Praskievicz, The University of North Carolina at Greensboro
Tomekia Simeon, Dillard University

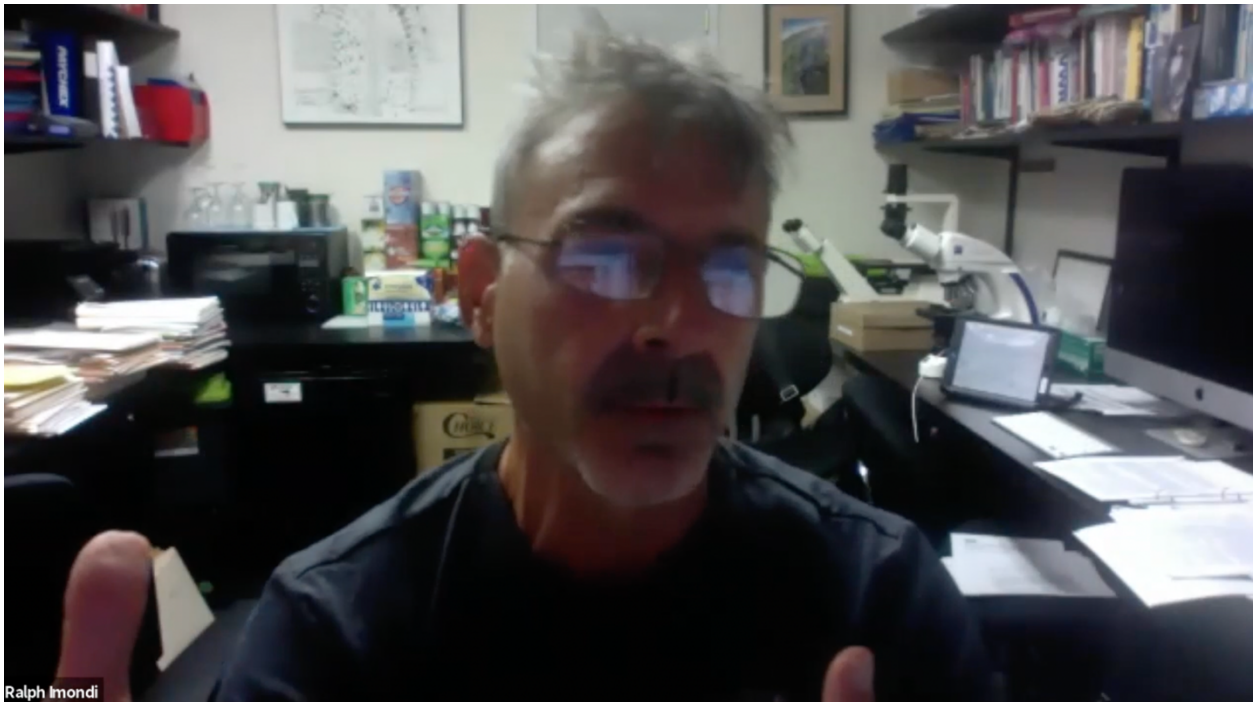
Program Sustainability: Successes and Challenges – Session 2

FACILITATOR:
CARLA ROMNEY, DSC, DIRECTOR OF RESEARCH, CITYLAB, BOSTON UNIVERSITY SCHOOL OF MEDICINE
PANELISTS:
DEBRA YOURICK, PHD, DIRECTOR, SCIENCE EDUCATION AND FELLOWSHIP PROGRAMS, WALTER REED ARMY INSTITUTE OF RESEARCH
KELLEY WITHY, MD, PHD, PROFESSOR AND DIRECTOR, HAWAII/PACIFIC BASIN AREA HEALTH EDUCATION CENTER, UNIVERSITY OF HAWAII/JOHN A. BURNS SCHOOL OF MEDICINE
MELISSA GILLIAM, MD, MPH, VICE PROVOST AND PROFESSOR OF OBSTETRICS AND GYNECOLOGY AND PEDIATRICS, UNIVERSITY OF CHICAGO
RALPH IMONDI, PHD, EXECUTIVE DIRECTOR, COASTAL MARINE BIOLABS INTEGRATIVE BIOSCIENCES INSTITUTE

The presenters shared the following approaches for building program sustainability:

- Provide course credit as inducement for participation
- Seek multiple funding sources (NSF, HHMI, private philanthropy, state and local government and tribal organizations)
- Charge for student visits to the facility where curriculum is taught
- Develop non-SEPA programming that is designed to bring in money and use funds to support SEPA activities
- Maintain positive and supportive relationships with partners and evaluators (even when plans change)
- Keep institutional leadership aware of program/progress/challenges/impact
- Cultivate new partners (in case some disappear during tough times)
- Change SEPA focus with successive applications, based on available partners and local ecosystem
- Build your own lab/research/program space to reduce dependence on university, others
- Train teachers and have them run workshops, to enhance dissemination and promote uptake of materials

- Create a for-profit entity and sell products as kits for teachers; this is eligible for SBIR funding; need licensing agreement with university for SEPA-created materials if SEPA grant was to a university
- Divide labor among the leadership team; build for sustainability in case one person leaves, moves on
- Partner with other organizations (i.e., Challenger centers)
- Need increase in annual SEPA budget in order to pay for more senior personnel effort



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Manetta Calinger, Wheeling Jesuit University
Donald DeRosa, Boston University
Carl Franzblau, Boston University
Adam Hott, Hudson, Alpha Institute for Biotechnology
Tania Jarosewich, Censeo Group
Teresa MacDonald, University of Kansas
Dina Markowitz, University of Rochester
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
Mziya Sarishvili, University of Hawai'i at Manoa
Charles Wood, Wheeling University
Kristine Wylie, Washington University
Karen Yanowitz, Arkansas State University

The Design Cycle: Using an Iterative Process Across Content Areas

FACILITATORS:
KRISTIN BRYNTESON, EDD, DIRECTOR, NIU STEAM, NORTHERN ILLINOIS UNIVERSITY
MELAN DUFFRIN, PHD, PROFESSOR, INTERDISCIPLINARY HEALTH, NORTHERN ILLINOIS UNIVERSITY

The goal of this session was to explore and discuss strategies for using the design cycle as an instructional tool across the curriculum. The session began with introductions of attendees and a statement of how they are currently using a design approach or iterative process in their classes or learning settings. The attendees then broke into groups for a sample design activity. This modeled how the design cycle can be used to drive an activity. This interactive element led to an engaging discussion on how the sample activity connects to current instructional practices. For the second portion of the session, the group explored various examples of iterative processes such as the writing cycle, the research cycle, the creative cycle, and the engineering design cycle. As a group, we discussed the similarities between the iterative processes in each domain. The group activity participated in sharing examples of how using an iterative approach can lead to increased student engagement in the classroom. Several of the attendees shared their own classroom example of how they use a design cycle to promote student learning. The group also shared tips and resources for using this approach in classrooms and other learning environments for learners of all ages.

Participants:

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Increasing COVID-19 Vaccine Confidence through Mythbuster Activities & Community Advocacy in the Biology Classroom

FACILITATORS:
JULIA BOGE, BS, INSTRUCTOR, BLUE VALLEY CENTER FOR ADVANCED PROFESSIONAL STUDIES
MARIA ALONSO LUACES, PHD, DIRECTOR, OFFICE OF DIVERSITY AND INCLUSION,
UNIVERSITY OF KANSAS MEDICAL CENTER

The goal of this session was to introduce a unit developed by T-SCORE KS (Teachers & Students for Community Oriented Research & Education), a group that aims to establish a learning community of teachers, students and researchers committed to bringing relevant community-based health issues into the classroom. This is a project-based unit that encourages students to examine the information they are receiving about the COVID-19 vaccine, empowering them to think critically about how vaccines work and the role that they play in keeping a community healthy. This unit can be utilized as individual lessons, or as a two-week unit, to inspire informed choice and community advocacy. Conference attendees left the session with ready-to-implement curriculum materials and knowledge of each lesson in the unit.

At the beginning of the session, the facilitators introduced themselves and gave participants the links to download the curriculum plan. A YouTube video was shown to give an overview of the lessons. At the start of this unit, students move through activities that explore the human immune

response, how vaccines work, and how infectious diseases spread. They then examine their own communities' COVID-19 vaccine confidence and vaccination rates. Finally, student groups create and present a health communication campaign targeted to their neighborhood.

After participants understood the flow of the unit, the facilitators explained two activities in more depth. The MythBusters activity takes place on day four of the unit. Participants were asked to model how students would share what they have heard about COVID-19 and discussed productive ways to facilitate that conversation. Breakout rooms were utilized so that participants could either model the activity in small groups or discuss how they could implement the activity. When participants came back from the breakout rooms, the conversation continued as a larger group before moving to the last activity.

The last activity was a deeper discussion of the community advocacy project, where students are asked to choose a focal community, assess their current COVID-19 vaccination rates, and brainstorm ideas for health communication plans. Participants were given time to discuss how they might use this in their classroom, in addition to brainstorming potential barriers to implementation. When participants returned from the breakout rooms, the final portion of the session was a reminder of the goals of T-SCORE and the units the group creates, as well as some time for final thoughts and connections.

Participants:

Rebecca Carter, Seattle Children's Research Institute
Michelle Domecki, University of Chicago
Maurice Godfrey, University of Nebraska Medical Center
Kymberly Grantham, Georgia State University
Joan Griswold, University of Washington
Mary Kay Hickey, Cornell University
Belen Hurle, NIH/NHGRI
Larry Johnson, Texas A&M University
Revati Masilamani, Tufts Medical School
Katherine McMillan-Culp, New York Hall of Science
Osvaldo Morera, University of Texas, El Paso
Elizabeth Parker, University of Maryland, Baltimore
Jen Taylor, University of Utah
J. Michael Wyss, University of Alabama at Birmingham

Addressing Equity and Inclusion

PRESENTERS:
DEBRA YOURICK, PHD AND NICOLE EKANEM, PHD, SCIENCE EDUCATION AND FELLOWSHIP PROGRAMS, WALTER REED ARMY INSTITUTE OF RESEARCH
JENNIFER UFNAR, PHD, VANDERBILT UNIVERSITY
KATHERINE BRUNA, PHD, PROFESSOR AND PI, URBAN ECOSYSTEM PROJECT, IOWA STATE UNIVERSITY
WILLIAM FOLK, PHD, PROFESSOR, UNIVERSITY OF MISSOURI

In this session, four speakers representing out-of-the-classroom STEM programs that prioritize equity and inclusion, spoke about the methods, outcomes, and future directions of their respective programs.

Dr. William Folk, from the University of Missouri, discussed his group's ability to link science and literacy instruction with multimodal STEM text sets. These sets were demonstrated to improve diverse learners' argumentation and claim-evidence-reasoning practices. His group's work is based on the importance of literacy skills in science learning and how its absence will prevent students from being able to engage in science learning, even if they so wish.

Representing Iowa State University's Urban Ecosystem Project, Dr. Katherine Bruna discussed one particular place- and people-based curriculum, Mosquitoes & Me, and how it was built from a TriSC3i pedagogical framework. This involves culture, cognitive, and communication components that ultimately result in great community building between participants.

From Vanderbilt University, Dr. Jennifer Ufnar discussed "Day of Discovery", a STEM pipeline program for middle school students in Metropolitan Nashville Public Schools (MNPS). Students spend one day per week in dedicated labs on the Vanderbilt campus, the Stratford STEM High School, and the Nashville Zoo. Scientists and teachers co-teach a research-based curriculum focusing on interdisciplinary STEM-related projects. Dr. Ufnar indicated that though the program is successful, they have identified a need to include the voices of BIPOC scientists and teachers and hope to alleviate this with various strategies.

Drs. Debra Yourick and Nico Ekanem represented Walter Reed Army Institute of Research and discussed their GEMS program with a focus on the improvements the summer, out-of-the-classroom and fall, in-classroom iterations are currently undergoing. Improvements pertain to a reimagining of the program's base model, near-peer mentorship. Near-peer mentors (NPMs), the undergraduate and recent graduates tasked with facilitating inquiry-based STEM education to 7th through 12th grade participants, will have specific changes to their already extensive training to accommodate newly modified protocols that promote the establishment of learning environments to be more inclusive for neurodiverse participants, and for neurodiverse NPMs themselves. This

work is being accomplished through a collaboration with DC Peers and supported through a grant awarded through the Army Educational Outreach Program and the National Science Teachers Association.

Participants:

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Renee Boney-Jett, University of Minnesota
Luke Bradley, University of Kentucky
Holly Brown, Walter Reed Army Institute of Research
Donna Cassidy-Hanley, Cornell University
Michelle Domecki, University of Chicago
Michelle Ezeoke, Georgia State University
Adrianne Fisch, Purdue University
Jacqueline Genovesi, Drexel University
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Bethany Hornbeck, Apis Creative
Barbara Hug, University of Illinois Urbana-Champaign
Allison McQueen, Tuft University
Brittany Michel, Dana-Farber/Harvard Cancer Center
Megan Morrone, Rockman Et Al
Elizabeth Parker, University of Maryland, Baltimore
Robyn Pennella, St. Jude Children's Research Hospital
Emaly Piecuch, The Jackson Laboratory
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Patrice Saab, University of Miami
Rebecca Smith, University of California – San Francisco Brittany Swift
Virginia Stage, East Carolina University
Laura Tenenbaum
Anastasia Thanukos, University of California, Berkeley
Anne Westbrook, BSCS Science Learning
Sarah Wojiski, The Jackson Laboratory
Charles Wray, The Jackson Laboratory
Karen Yanowitz, Arkansas State University

Concurrent Breakout Sessions:

Thursday, May 27, 2021 – 3:00 PM – 4:00 PM

Applying for a SEPA Grant: Information for Potential Applicants

PRESENTER: TONY BECK, PHD, PROGRAM DIRECTOR, SCIENCE EDUCATION PARTNERSHIP AWARD (SEPA), DIVISION FOR RESEARCH CAPACITY BUILDING, NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES (NIGMS), NIH

In this session, Dr. Beck provided information about the SEPA program and the SEPA funding announcement (https://grants.nih.gov/grants/guide/pa-files/PAR-20-153.html). He also shared tips on best practices and things to avoid when writing a SEPA grant proposal.

Participants:

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Julie Bokor, University of Florida
Loretta Brady, Saint Anselm College
Karen Burns-White, Dana-Farber/Harvard Cancer Center
Jose Chavero Rivera, Baylor College of Medicine
Melani Duffrin, Northern Illinois University
Elizabeth Edmondson, Virginia Commonwealth University
Michelle Ezeoke, Georgia State University

Maurice Godfrey, University of Nebraska Medical Center
Becky Gonda, University of Pittsburgh
Susan Heilman, Museum of Science
Tim Herman, Milwaukee School of Engineering
Dave Holben, University of Mississippi
Barbara Hug, University of Illinois Urbana-Champaign
Jana Jaran, Barnard College
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Suzanne Kirk, Virginia Commonwealth University
Revati Masilamani, Tufts Medical School
Jasmina Mesic, FoodMASTER
Brittany Michel, Dana-Farber/Harvard Cancer Center
Mia Minen, University of Tennessee, Knoxville
Catherine Morton, West Virginia University
Anjan Nan, University of Maryland, Eastern Shore
Elizabeth Ozer, University of California San Francisco
Michael Pickart, Concordia University Wisconsin
Sarah Praskievicz, The University of North Carolina at Greensboro
Carla Romney, Boston University
Mandana Sassanfar, Massachusetts Institute of Technology
Tomekia Simeon, Dillard University
Joyce Solheim, University of Nebraska Medical Center
Virginia Stage, East Carolina University
Amy Warren, NorthWest Arkansas Community College
Melinda VanDevelder, Virginia Commonwealth University

Avoid the Void- How to Effectively Disseminate Your Findings and Communicate with Your Audience, Instead of Shouting into the Void

FACILITATOR:

ADAM HOTT, PHD, DIGITAL APPLICATION LEAD, HUDSONALPHA INSTITUTE FOR BIOTECHNOLOGY

PANELISTS:

KRISTIN BASS, PHD, DIRECTOR OF RESEARCH DEVELOPMENT, ROCKMAN ET AL COOPERATIVE INC.

JENNIFER UFNAR PHD, EXECUTIVE DIRECTOR, COLLABORATIVE FOR STEM EDUCATION AND OUTREACH, VANDERBILT UNIVERSITY

The purpose of this session was to provide attendees with ideas of how to effectively disseminate both research findings from their projects, and products that have been the direct result of NIH SciEd projects. Kristin Bass from Rockman and Jennifer Ufnar from Vanderbilt were invited to present during this session.

Kristin Bass highlighted a variety of ways for life science education research to be disseminated, starting with identifying the intended audience. The audience often drives the dissemination type and is different between practitioners/educators and researchers. Finding the appropriate venue

was also discussed and included suggestions of how to disseminate through professional organizations, newsletters, open access journals, news media, blogs, social media and infographics.

Jennifer Ufnar presented information on choosing the correct journal for publication of research results. A specific overview of the Journal of STEM Outreach, an online open access journal, was included with discussion of the variety of article types that JSO supports. Discussion between both authors and attendees was productive and included questions about publishing research and methodologies as well as how to effectively communicate with non-research audiences. Attendees were especially interested in non-traditional methods such as blogs and news media coverage of NIH SciEd supported projects. Many attendees were also interested in cross NIH SciEd dissemination on a national level. Suggestions from the attendees included the development of a clearinghouse or special interest group to share products and methodologies across the SciEd community.

Participants:

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Robin Bartlett, University of Alabama
Luke Bradley, University of Kentucky
Desmond Campbell, Vanderbilt University
Donna Cassidy-Hanley, Cornell University
Karin Chang, University of Missouri- Kansas City
Jose Chavero Rivera, Baylor College of Medicine
Dina Drits-Esser, University of Utah
Martina Efeyini, University of Maryland, Baltimore
Jacqueline Genovesi, Drexel University
Kymberly Grantham, Georgia State University
Renee Hesselbach, University of Wisconsin – Milwaukee
Bethany Hornbeck, Apis Creative
Tania Jarosewich, Censeo Group
Lauren Johnson, Washington University in St. Louis
Brinley Kantorski, Partnerships in Prevention
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Sandra San Miguel, Purdue University
Sharon Pepenella, Cold Spring Harbor Laboratory DNA Learning Center
David Petering, University of Wisconsin-Milwaukee
Kevin Phelan, University of Arkansas for Medical Sciences
Emaly Piecuch, The Jackson Laboratory
Anja Scholze, The Tech
Louisa Stark, University of Utah
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Shelley Stromholt, Aspect Research + Evaluation
Sarah Will, Partnerships in Prevention
Sarah Wojiski, The Jackson Laboratory
Kristine Wylie, Washington University
Karen Yanowitz, Arkansas State University

Curricular Tools Flea Market

FACILITATORS:
CHRISTOPHER PIERRET, PHD, ASSISTANT PROFESSOR OF BIOCHEMISTRY AND MOLECULAR BIOLOGY, MAYO CLINIC - ROCHESTER
ZACH WAREJONCAS, PROGRAM MANAGER, MAYO CLINIC AND INSCIED OUT

The flea market can certainly be considered a success again (even in the digital realm of 2021). The teams that participated as tables included:

1. Cells in Context (Jen Taylor, University of Utah)
2. Exploring Genetics through Genetic Disorders (Molly Malone, University of Utah)
3. Knology (Jena Barchas-Lichtenstein and Nicole LaMarca, Knology)
4. Photovoice (Lisa Marriott, Oregon Health & Science University)
5. Anecdata (Anna Farrell, MDI Biological Laboratory)
6. Ticks, Biodiversity, and Climate (Danielle Alcena-Stiner, University of Rochester)
7. Hyperdocs and Websites (Joan Griswold, University of Washington)
8. Create for STEM (Bianca Alexander, Michigan State University)
9. REACH (Anna Kiley, Carolyn Hester, and David Jones, University of Montana)
10. Partnership in Education (Brinley Kantorski and John Pollock, Duquesne University)
11. PEER Program (Torri Whitaker and Michele Ward, Texas A&M University)
12. Mosquitoes SUCK! (Sara Erickson and Katherine Bruna, Iowa State University)
13. StreamLabs (Zach WareJoncas and Chris Pierret, Mayo Clinic-Rochester)

The key win was interactions among the participating tables. Technical issues came about, in that visitors leaving breakout rooms were forced to leave the whole zoom to return to the next room. The number one growth feedback theme was "let's get back to doing this in person." This type of tangential experience is likely a solid addition because it pushes participants to pitch an idea for revenue generation, something that is a likely way to sustain the SEPAs going forward. This year we did not have Program Directors from SBIR participate, but that will be added if accepted again in the future.

OpenSciEd: Instructional Materials to Change Worlds

FACILITATOR:
CARLA ROMNEY, DSC, DIRECTOR OF RESEARCH, CITYLAB, BOSTON UNIVERSITY SCHOOL OF MEDICINE
PANELISTS:
MATT KREHBIEL, MS, OUTREACH DIRECTOR, OPEN SCIED
JEANNE CHOWNING, PHD, SENIOR DIRECTOR, SCIENCE EDUCATION, FRED HUTCHINSON CANCER RESEARCH CENTER

Key Points:

- OpenSciEd is committed to producing free, high quality science education materials
- Extensive review and vetting of materials
- Build on students' prior knowledge and use a student-driven approach
- 10 states have already partnered with OpenSciEd (teaching the OpenSciEd units and giving feedback)
- OpenSciEd materials are free to use, share, adapt
- Description of OpenSciEd Instructional Model
    - Anchoring Phenomenon (drive student curiosity and questions)
    - Driving Questions
    - Navigation
    - Investigation
    - Put the Pieces Together
    - Problematizing
    - Investigation
    - Put the Pieces Together
    - Questions Answered

- OpenSciEd materials for grades 6,7, 8 are developed and can be downloaded from https://www.openscied.org/. Now working on high school and elementary (launch in Fall 2021).
- Uses the EQuIP rubric, 3 Dimensional Learning/NGSS
- Active Facebook user groups (organized by unit)
- Seeking engagement with teachers, SEPA projects
- Kits of OpenSciEd materials are available through AquaPhoenix (www.aquaphoenixsci.com)
- Kendall-Hunt is slated to produce the materials as books
- Materials are available in English and Spanish

Participants:

Loretta Brady, Saint Anselm College
Liliana Bronner, University of Nebraska Medical Center
Holly Brown, Walter Reed Army Institute of Research
Donna Cassidy-Hanley, Cornell University
Noah Glaser, University of Connecticut
Ben Gorski, University of Maryland Baltimore
Terri Gulick, University of Nebraska Medical Center
Sheila Homburger, University of Utah
Barbara Hug, University of Illinois Urbana-Champaign
Amanda Jones, Seattle Children's Research Institute
Meghan Leadabrand, University of Nebraska, Lincoln
Teresa MacDonald, University of Kansas
Julia McQuillan, University of Nebraska – Lincoln
Allison McQueen, Tuft University
Kauionalani Mead, Hawaii/Pacific Basin Area Health Education Center
Megan Morrone, Rockman Et Al
Elizabeth Parker, University of Maryland, Baltimore
David Petering, University of Wisconsin-Milwaukee
Brittany Swift
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Common Acronyms and Abbreviations

HHS	U.S. Department of Health & Human Services
AHRQ	Agency for Healthcare Research and Quality
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare & Medicaid Services
FDA	U.S. Food and Drug Administration
HRSA	Health Resources & Services Administration
IHS	Indian Health Service
NIH	National Institutes of Health
PHS	Public Health Service • SAMHSA - Substance Abuse and Mental Health Services Administration
NIH	National Institutes of Health ICs – NIH Institutes and Centers

Abbreviation	CODE	NIH Institutes
NCI	CA	National Cancer Institute • YES – Youth Enjoy Science Research Education Program
NEI	EY	National Eye Institute
NHLBI	HL	National Heart, Lung, and Blood Institute
NHGRI	HG	National Human Genome Research Institute • Genome – commonly used name for NHGRI
NIA	AG	National Institute on Aging
NIAAA	AA	National Institute on Alcohol Abuse and Alcoholism
NIAID	AI	National Institute of Allergy and Infectious Diseases
NIAMS	AR	National Institute of Arthritis and Musculosketal and Skin diseases
NIBIB	EB	National Institute of Biomedical Imaging and Bioengineering
NICHD	HD	Eunice Kennedy Shriver National Institute of Child health and Human Development
NIDCD	DC	National Institute on Deafness and Other Communication Disorders
NIDCR	DE	National Institute of Dental and Craniofacial Research
NIDDK	DK	National Institute of Diabetes and Digestive and Kidney Diseases
NIDA	DA	National Institute on Drug Abuse
NIEHS	ES	National Institute of Environmental Health Sciences
NIGMS	GM	National Institute of General Medical Sciences
NIMH	MH	National Institute of Mental Health

NIMHD	MD	National Institute on Minority Health and health Disparities
NINDS	NS	National Institute of Neurological Disorders and Stroke
NINR	NR	National Institute of Nursing Research
NLM	LM	National Library of Medicine
CC		NIH Clinical Center
CIT		Center for Information Technology
CSR		Center for Scientific Review • CSR manages for annual SEPA and SEPA SBIR/STTR STEM Games reviews
FIC		Fogarty International Center
NCATS	TR	National Center for Advancing Translational Sciences • CTSA – Clinical and Translational Science Awards
NICCIH		National Center for Complementary and Integrative Health

NIGMS – National Institute of General Medical Sciences

DRCB	Division for Research Capacity Building Dr. Ming Lei, Director
IDeA	Institutional Development Awards • INBRE – IDeA Networks of Biomedical Research Excellence • COBRE – Centers of Biomedical Research Excellence • IDeA Program Infrastructure for Clinical and Translational Research (IDeACTR) • STTR Regional Technology Transfer Accelerator Hubs for IDeA States
NARCH	Native American Research Centers for Health
SCORE	Support of Competitive Research Program
SEPA	Science Education Partnership Award Program
TWD	Division of Training, Workforce Development, and Diversity Dr. Alison Gammie, Director
Bridges	Bridges to the Baccalaureate Bridges to the Doctorate
BUILD	Building Infrastructure Leading to Diversity Career Development Awards
IMSD	Initiative for Maximizing Student Development
IRACDA	Institutional Research and Academic Career Development Awards
K99 → R00	Pathway to Independence Award
MARC U*STAR	Undergraduate Student Training in Academic Research
NRMN	National Research Mentoring Network
NRSA-Fs	Individual Predoctoral National Research Service Award Fellowships
NRSA-F32	Individual Postdoctoral National Research Service Award
NRSA-T32	Institutional Predoctoral National Research Service Award
PREP	Postbaccalaureate Research Education Program

RISE	Research Initiative for Scientific Enhancement

NIH Grant-Associated Terms

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

NSF – National Science Foundation

EHR	Education and Human Resources
DRL	Research on Learning in Formal and Informal Settings
AISL	Advancing Informal STEM Learning
ATE	Advanced Technological Education
CSforAll:RPP	Computer Science for All
DR-K12	Discovery Research PreK-12
ECR	EHIR Core Research
ITEST	Innovative Technology Experiences for Students and Teachers
S&CC	Smart and Connected Communities
STEM+C	STEM + Computing K-12 Education

America's Seed Fund

EA	Educational Technologies and Applications • STEM Games SBIR/STTR

Other Federal Agencies Involved in STEM Education

ED	U.S. Department of Education • IES – Institute of Education Sciences • STEM Games SBIR/STTR
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
USDA	Unites States Department of Agriculture • NIFA – National Institute of Food and Agriculture