**PosTER ROUNDTABLES Abstracts**

**Poster Roundtables Session 1: Wednesday, May 29, 1:30-2:15pm**

**Broadening Participation, set 1 of 3: Wednesday, 1:30 – 2:15 pm**

**Room: Flagstaff**

**League of VetaHumanz**

*Authors:* Sandra San Miguel, Lindley McDavid, Loran Carleton Parker, Wilella Burgess, Grace Craig G, Aubree Buck, Purdue University

The League of VetaHumanz consists of veterinarians in academia, practice, and industry who provide in-person and remote role modeling experiences to under-resourced youth. VetaHumanz improve health literacy and reduce health disparities in people and their animals by modeling and communicating the positive impact of veterinary medical research on public health and animal health, while facilitating career exploration and experiential learning for aspiring veterinarians. To reach children lacking access to in-person program experiences, SuperPower Packs, self-guided, veterinary STEM learning experiences, were developed. Leveraging social cognitive career theory and the “Batman Effect,” SuperPower Packs engage children in the veterinary profession, build self-efficacy, and seed career aspirations through fun learning activities. Over 21,500 SuperPower Packs have been distributed to children. Results of evaluation surveys measuring participant activity engagement, likelihood of role model identification, and demographics are presented. Together, our role model-led and self-guided experiences set the stage to encourage youth to pursue similar learning opportunities in the future.

*Funder:* SEPA

**Impact of Science Communication Workshops on Scientists’ Ability to Engage High School Students**

*Authors:* Gwen Alexander, St. Jude Children's Research Hospital; Shelby Montague, Lausanne Collegiate School; Jaime Sabel, University of Memphis; Sondra LoRe, Spear Consultants; Amy Cook, University of Memphis; Kate Ayers, St. Jude Children's Research Hospital

Student interest in pursuing careers in biomedical research and development of scientific identity may be positively impacted by interactions with scientists, provided however, the scientist is able to communicate complex scientific research concepts in an accessible manner. The challenge to scientists oftentimes is conveying and increasing scientific understanding of research concepts to the students. The Memphis STEMM Ambassadors Classroom is a curriculum collaborative program developed to expose high school students, typically juniors and seniors, to a science journal club presented by practicing scientists. The program aims to increase scientific understanding as research topics are discussed, promote strong, positive scientific identities, and inspire students to pursue careers in biomedical research. Through communication workshops, participating scientists create a lay summary of a research article

that they prepare and present to high school science classrooms as journal clubs. The journal club sessions are delivered via a virtual platform with each participating scientist presenting their research article in three different classrooms. Students, in turn, provide feedback to the scientists on how well they conveyed their science. Based on pre- and post-survey data, the scientists experienced improvements in confidence, presentation delivery and overall student engagement.

*Funder:* SEPA

**A virtual multi-university collaboration to engage underrepresented high school students in cancer research and care**

*Authors:* Megan Mekinda, University of Chicago; Holly Burke, University of Kentucky; Eileen Dolan, University of Chicago; Rebecca Fairchild, University of Pennsylvania; Sarah Hawley, University of Michigan; Cauleen Noel, University of Pennsylvania; Rachel Privett, University of Michigan; Nathan Vanderford, University of Kentucky; Kristen Wynn, University of Texas at Austin

The Summer Healthcare Experience (SHE) in Oncology is a virtual, multi-institutional STEM enrichment program for high school students with a mission to increase participation of women from underrepresented backgrounds in the cancer biomedical workforce. The curriculum offers hands-on research experience, career exploration, mentorship, and leadership training, drawing strategically from the unique strengths and resources of five of the nation’s top cancer centers. Programming is delivered collaboratively and synchronously across the five sites, connecting trainees to an expansive network of peers, mentors, and opportunities in cancer research and care. The program’s multi-institutional structure also creates rich context for the study of social determinants of health, barriers to care, and other factors undermining cancer health equity within participants’ respective communities, including rural, urban, racially diverse, and socioeconomically challenged. Program outcomes reflect significant gains in trainees’ scientific knowledge, biomedical career awareness, and confidence and sense of belonging in STEM. SHE trainees also report that the program enhanced important generalizable skills including critical thinking, self-directed learning, and the ability to communicate scientific concepts. This proposal details plans to sustain and grow SHE in important ways including year-round programming and enhanced support for program alumni.

*Funder:* American Cancer Society

**Improving middle grade STEM interest and increased learning using GN and DOC**

*Authors:* Andrij Holian, University of Montana; Paulette T. Jones, University of Montana; Rebecca Burg, University of Montana; Garion T. Holian, University of Montana; Scott Warren, University of North Texas

Education in science, technology, engineering, and math (STEM) fields is critical to prepare students for careers within the biomedical sciences. There is an increasing concern that fewer students are considering pursing research careers which will have a long-term consequence. The purpose of this project is to create novel well-designed educational media that supports strong science-focused teacher pedagogy and increases student interest in science topics and STEM careers. We propose that educational media assets such as creative graphic novels and digital videos, targeted to middle school students, could be used to both assist teachers and encourage student interest. Such educational media resources can help students to understand team-based collaboration, achieve growth in assessed learning outcomes, and provide exposure to possible STEM career choices. The project involves scientists, writers, artists, teachers, and evaluators in a collaborative effort to develop and test graphic novels and videos that will be made broadly available.

*Funder:* SEPA

**Teen Wellness Connection**

*Authors:* Katherine Nielsen, UC San Francisco; Rachel Harris, UC San Francisco; Sabine Jeske, UC San Francisco; Linda Morrell, UC Berkeley; Mingfeng Xue, UC Berkeley; Mark Wilson, UC Berkeley; Michelle Phillips, Phillips & Associates

Teen Wellness Connection (TWC), led by the Science & Health Education Partnership (SEP) at UC San Francisco, seeks to foster leadership and public health interest in high school students. Teen leaders collaborate with UCSF scientists and health researchers to learn about health issues facing teens, and then work together to create a one-day Teen Wellness Summit for their peers. The 2024 Summit focused on adolescent mental health and drew 120 attendees. TWC is expected to increase URM student interest in post-secondary education in biomedical science fields and health science careers, ultimately broadening participation in the health science workforce. Also, in collaboration with learning researchers at UC Berkeley, we are developing a validated instrument to measure “Belonging in Science,” will test the impact of TWC on students’ sense of belonging, and will publish the results of the learning research in peer-reviewed journals to inform and advance the science education community’s understanding of adolescent belonging in science.

*Funder:* SEPA

**Science Career Inquiry-Exploring Native Cultural Experiences (SCIENCE) Program**

*Authors:* Kauʻionalani Mead, Hoʻola Music and Cultural Arts

Science Career Inquiry -Exploring Native Cultural Experiences (SCI-ENCE) Program is designed to introduce an innovative way to teach science to students in grades 2-8 using culturally appropriate and locally applicable stories like this one. Weaved within the tapestry of our story is our language, real life stories of community members, music, hands-on art and science projects and other educational aspects that help our youth become well-rounded individuals, all while learning the Hawaiian Values of our kupuna.

*Funder:* SEPA

**Curriculum Development, set 1 of 2: Wednesday, 1:30 – 2:15 pm**

**Room: Uintah**

**ALL for Science: Authentic Literacy and Language for Science**

*Authors:* Nancy Moreno, Baylor College of Medicine; Misty Sailors, WestEd; Alana Newell, Baylor College of Medicine; Dolores Gray, Baylor College of Medicine; Molly Marek, University of Texas; Travis Kelleher, Baylor College of Medicine; Michelle Moore, Baylor College of Medicine; Jimmie Thomas, Baylor College of Medicine; Katherine Harris, Baylor College of Medicine

To support young learners' development of science specific disciplinary literacies - tools, skills and techniques applied to create and interpret text - and help them to connect the work of scientists with their own identities, we created a framework to provide authentic experiences with literacy strategies in science. This poster presents the curriculum development, evaluation and research findings from ALL for Science over the past year.

*Funder:* SEPA

**Frontiers in Cancer Research**

*Authors:* Jeanne Chowning, Fred Hutch; Regina Wu, Fred Hutch; Kristen Bergsman, Fred Hutch

Frontiers in Cancer Research is completing its final year of funding. Throughout the program's lifespan, our dedicated team and partners have been deeply involved in collaborative curriculum design, classroom-based research, and the enhancement of teacher professional development. At the conclusion of our work, we have developed two cancer units for high school. Our Intro to Cancer: Leukemia & Hina's Story was designated as a "Quality Example of NGSS Design" by the NextGenScience Peer Review Panel. Furthermore, our classroom research has yielded insights into how students engage with curriculum designed to encourage discourse. In this culminating poster presentation, we encapsulate the knowledge gained and the lessons learned throughout our journey.

*Funder:* SEPA

**NeuroLab: Bridging neuroscience and big data literacy in the high school science classroom using a collaborative, NGSS-responsive approach to unit development**

*Authors:* Ralph Imondi, Integrative Biosciences Program at Coastal Marine Biolabs; Kristin Bass, Rockman et al.; Linda Santschi, Integrative Biosciences Program at Coastal Marine Biolabs

Addressing the current shortfall of neurologists in the healthcare field requires innovative approaches to stimulate student interest in neurology, neuroscience, and allied fields. In support of this goal and a growing need to expand our capacity for STEM outreach in formal K-12 educational settings, we launched the NeuroLab 2.0 project. This curriculum design and development effort established in-depth scientist-teacher collaborations centered on the creation and implementation of an NGSS-responsive, storyline-based instructional unit with a strong emphasis on developmental neuroscience and data literacy. The newly developed storyline unit engages students in the construction of an explanatory model for a heritable disorder affecting voluntary movement. In this roundtable poster session, we will highlight the novel strategy that we developed for unit co-design and summarize our approach to professional development. We will also introduce the suite of initial resources developed to support teachers and students in the gradual construction of a multi-component explanatory model that assimilates behavioral, electrophysiological, neuroanatomical, molecular genetic, cellular, developmental, and neuroimaging data obtained from studies of human subjects and model organisms over the last several decades. Direct program impacts on teacher co-developers and early adopters, and indirect program impacts on students will also be discussed.

*Funder:* SEPA

**The Biology of Climate Change: Impacts on Human Health and the Science of Solutions**

*Authors:* Kristin Fenker and Louisa Stark, University of Utah

Today’s students are a critical demographic that need skills to make educated decisions on complex issues related to climate change and health. In this new project, the Genetic Science Learning Center will involve middle and high school teachers in the co-design of curriculum “mini-modules” on climate and health. Covering these topics in science classrooms presents the opportunity to develop materials that build climate literacy through the lens of hope, with a focus on real world solutions driven by scientists in a range of careers. We will conduct research studies to determine the effect of our strategy on students' beliefs and intentions, as well as an efficacy study of each module’s impact on NGSS-aligned student learning.

*Funder:* SEPA

**Informal Science Education, set 1 of 3: Wednesday, 1:30 – 2:15 pm**

**Room: Sun Valley**

**Collaborative Scientific Inquiry as a Strategy to Achieve Cardiometabolic Assessments in School Aged Children**

*Authors:* Rodrigo Tocuyo, Dimas Broco, Jaime Fuster, Ingrid Rodriguez, Lucia del R. Martínez and Maribel Campos Rivera; University of Puerto Rico Medical Sciences Campus

The stigma associated with obesity and other nutrition-related disorders has negatively influenced the disposition to support institutional (i.e. School) based assessments. The cautionary approach proposed by many out of concerns for worsening mental health challenges among those affected leaves our capacity to inform the status of children and communities who are currently underserved. As a STEM+M program dedicated to promoting self-care and whole-person health via scientific inquiry, our transdisciplinary community joins forces to engage children in comprehensive cardiometabolic assessments as part of their scientific exploration of how their body works. Our fellows receive formative training and complete the Fitnessgram protocol as part of their experience. Medical students and Pediatrics residents report back to parents following an asset-based approach as part of our Community Pediatrics Rotation. Our community-based approach and integration into experiential science education was developed to reframe the perception and re-establish the role of institutionally based assessments.

*Funder:* SEPA

**Empowering Latina STEM Girl Ambassadors Through Role Models, Leadership, and STEM-Related Experiences**

*Authors:* Greetchen Díaz-Muñoz, Ciencia Puerto Rico; Liz Hernández-Matías, Ciencia Puerto Rico; and Giovanna Guerrero-Medina, Ciencia Puerto Rico and Office of Diversity, Equity and Inclusion, Yale School of Medicine

Gender stereotypes and lack of access to relatable role models, mentors, and STEM opportunities have been suggested to deter middle school girls and students from underrepresented backgrounds away from STEM. Seeds of Success, an out-of-school program, is designed to inspire girls to consider STEM careers by countering gender stereotypes through relatable role models, promoting STEM confidence through STEM workshops and hands-on activities, and encouraging alignment between cultural and STEM identities through community-based STEM projects that develop leadership skills. Since 2015, the program has impacted 565 students who in turn have reached more than 61,000 people in Puerto Rico through their STEM Ambassadors projects. A robust mix-method evaluation of the 2020 and 2021 cohorts demonstrates significant improvements in participants’ STEM attitudes and science identity, as well as in their self-perception as a leader, confidence in their ability to succeed in science, knowledge about STEM careers and opportunities, and access to STEM role models. Moreover, 95% of participants intend to continue participating in STEM activities after the program and overall scores for the entire survey were significantly higher after the program than before. We discuss lessons learned for other programs seeking to empower girls from historically underserved backgrounds in STEM.

*Funder:* SEPA

**Reflections on Blending Arts and Biomedical Science to Facilitate Systems Thinking.**

*Authors:* *Robert William Danielson, Molly Louise Kelton, Jeb P. Owen, Alison Joanne White, AnaMaria Diaz Martinez, David Garcia, Elizabeth Grace, Kristin Saba Fisher, Kellen Pautzke, Washington State University; Emma Stacy; Georgia State University; Braelyn Young, West Virginia University.*

Health Education through Arts-based Learning (HEAL) is a SEPA-funded health education project. The present investigation seeks to understand how arts integration into STEM curriculum could support systems thinking around socio-scientific issues, specifically around the issue of pathogen transmission in rural-agricultural communities. Our after-school program, which works with 3rd – 5th grade students in rural-agricultural communities, leverages the arts to promote systems-level understanding of zoonotic diseases and ecosystem dynamics. In this poster, we report on findings from multiple iterations of our learning modules and share the creation and iteration of these modules. We discuss both successes and challenges across implementations and measurements.

*Funder:* SEPA

**Co-Designing Public Health Exhibits and Programs at a Science Museum**

*Authors:* Franklin Aucapina, New York Hall of Science; Satbir Multani, New York Hall of Science; Dana Schloss, New York Hall of Science

High school and college students are becoming more involved in conversations and activities that challenge policies surrounding the health of their communities. These young people are often the target audience of interventions-programs and activities-aimed to increase their engagement with STEM learning and affect their STEM career pathways. How can we recognize the critical role of youth participation in the design and development of these very interventions? Hear from the New York Hall of Science about our ongoing co-design process with yearly cohorts of high school and college Explainer SEPA Fellows. Learn about how our current Fellows are exploring the intersection of STEM and public health, their relationship to the public health ecosystem, and co-designing a youth public health career workshop through mindful facilitation and access to experts in the field. Check out the visual artifacts they have created as part of their learnings!

*Funder:* SEPA

**Latinx High School Students’ Reflections about a University Summer Research Program Support the Use of Asset Bundles in Designing Programs for Broadening STEM Pipelines**

*Authors:* Perla C. Perez, University of Texas at El Paso; Denise N. Delgado, University of Texas at El Paso; Josefina Tinajero, University of Texas at El Paso; Thomas Boland, University of Texas at El Paso; Osvaldo F. Morera, University of Texas at El Paso

Latinx individuals are under-represented in STEM and biomedical fields. Research by Johnson and Bozeman has shown that the asset bundle framework can be used to help minoritized individuals succeed in STEM and professional schools. This model has been widely applied to college students, but little work has been done with high school students. A formalized summer research program to allow students to participate in university research was implemented that is geared toward underrepresented high school students at predominantly Latinx high schools in the Southwest using the asset bundle framework. Over the last two years, 10 students have participated in a 4 to 5-week summer research program. Seven of these ten students were interviewed about their experiences in the program. Data were analyzed using a grounded theory approach. Themes from the asset bundles framework emerged in these interviews that were indicative of student interest in biomedical pursuits, suggesting that asset bundles can be used to promote biomedical careers among Latinx high school students.

*Funder:* SEPA

**STEAM in Action: Co-created environmental health science for Learning, Justice and Action**

*Authors:* Jennifer Richardson, University of Arizona; Sanlyn Buxner, University of Arizona; Mónica D. Ramírez-Andreotta, University of Arizona M

Environmental justice (EJ) communities are areas with disproportionate exposure and vulnerability to environmental hazards, and exist worldwide. Building upon a decade of community-engaged research and co-created environmental health science, the Integrated Environmental Science and Human Risk Laboratory at the University of Arizona is working alongside communities that neighbor resource extraction activities, to create an educational model that addresses community-identified EJ and public health issues. Through the collaborative engagement of scientists and local community members, this U.S. federally funded project includes informal science learning activities, community and youth advisory boards, co-created community science, and youth/adult trainings with five rural, fenceline EJ communities. Our goal is to work alongside these communities to address their EJ concerns and empower them to be change agents in their communities. Preliminary baseline data show that participants are concerned with copper mining and the associated pollution occurring in their community. Community members are interested in increasing access to scientific educational opportunities to better understand the environmental risks that affect their lives. We will report on the details and progress of our model in an effort to share, connect, and collaborate with others that are engaged in similar work.

*Funder:* SEPA

**Research & Evaluation, set 1 of 2: Wednesday, 1:30 – 2:15 pm**

**Room: Snowbasin**

**Cultivating Project Resilience: Moving Through Disruption to Reimagination**

*Authors:* Rebekah Davis, PhD, NC State University; Dana Haine, MS, University of North Carolina at Chapel Hill; Lynn Chesnut, PhD, University of North Carolina at Chapel Hill; Kathleen Gray, PhD, University of North Carolina at Chapel Hill.

Project disruptions are common in grant-funded work, especially with multi-year projects, and may arise due to personnel departures, loss of resources, or challenges encountered in a changing sociopolitical landscape. During this session, the external evaluator of the NIGMS-funded Iterative Design to Engage All (IDEA) Learners Program will lead discussion of challenges, opportunities and implications associated with the departure of a key contributor in the early years of the program. While sharing adversity with others can be beneficial, there may be reluctance to share with those outside a project team (such as other project teams, funders, etc.) for fear of negative impacts. However, sharing challenges and stories of overcoming program threats could help project teams identify more strongly with others and develop collective resilience (King, Newman & Luthans, 2015). The aim of this session is to explore how teams reshape and recover to move forward. Poster session attendees will be asked to share their own experiences overcoming and moving past setbacks, with the goal of developing a shareable list of considerations and strategies for projects needing support in times of transition.

King, D. D., Newman, A., and Luthans, F. (2016) Not if, but when we need resilience in the workplace. J. Organiz. Behav., 37: 782–786. doi: 10.1002/job.2063.

*Funder:* SEPA

**Mapping Your Success - Program Evaluation Design**

*Authors:* Sondra LoRe PhD, SPEAR (STEM Program Evaluation, Assessment & Research) Consultants

Program evaluation design and implementation are critical to project success as they offer data-informed, culturally responsive feedback for making iterative changes to improve impacts and sustainability. This poster session will share ways to map programs that are inclusive of people intended to be served by programs, as well as sample metrics and program evaluation tools from two SEPA program evaluations, demonstrating the importance of mixed methods, culturally responsive, and utilization-focused approaches to program evaluation.

*Funder:* SEPA

**MYHealth Summer Launch: Increasing Researcher Identity in High School Students through a 10-Day Summer Camp on Health Research**

*Authors:* Juniar Lucien, University of Michigan Department of Family Medicine; Annika Agni, University of Michigan Department of Family Medicine; Jennifer Arroyo, University of Michigan Department of Family Medicine; Bianca Barraza, University of Michigan Department of Family Medicine; Ashley Durden, University of Michigan Department of Family Medicine; Hasan Khan, University of Michigan Department of Family Medicine; Cindy Ko, University of Michigan Department of Family Medicine; Rafee Mirza, University of Michigan Department of Family Medicine; Morenikeji Ojubanire, University of Michigan Department of Family Medicine; Arulvel Rajeswaran, University of Michigan Department of Family Medicine; Olivia Terry, University of Michigan Department of Family Medicine; Samantha A. Chuisano, University of Michigan Department of Family Medicine; Beatrice Palazzolo, University of Michigan Department of Family Medicine; Alison Allen, Rockman, et al Cooperative Lisa M. Vaughn, Cincinnati Children’s Hospital Medical Center/University of Cincinnati College of Medicine; Shanna Stryker, University of Cincinnati Department of Family and Community Medicine; Tammy Chang, University of Michigan Department of Family Medicine; Melissa DeJonckheere, University of Michigan Department of Family Medicine

MYHealth Summer Launch is a 10-day, online health research summer camp in Southeast Michigan that aims to increase high school students’ ability to see themselves as researchers (researcher identity), their interest in research, and their motivation towards science. Students from backgrounds that are underrepresented in health research careers are engaged in panel discussions with professional researchers and group activities facilitated by undergraduate students pursuing STEM degrees.

Demographics were self-reported at baseline and researcher identity, research interest, science motivation were measured via validated scales at pre-post. Scale and subscale scores (1 to 5) were summarized using descriptive statistics and means were compared using paired t-tests.

Repeated measures were available for 34 of 38 Summer Launch participants. Participants primarily identified as women (68%), Indian or South Asian (40%), White/European (27%), or African American/Black (23%) and either first- (63%) or second generation (23%) immigrants to the US. About half (51%) had never attended a science camp. We found a statistically significant increase in researcher identity average scores (+0.32 point increase, p = 0.02) following Summer Launch. No other statistically significant differences were detected. Engaging in a 10-day online summer camp allowed MYHealth participants to initiate or strengthen their researcher identity.

*Funder:* SEPA

**STEM Assessment and Reporting Tracker (START)**

*Authors:* Stephanie E. Paris, Oregon Health & Science University; Shanthia N. Espinosa; Oregon Health & Science University; Amanda B. Braley, Oregon Health & Science University; and Lisa K. Marriott, Oregon Health & Science University.

This project built the STEM Assessment and Reporting Tracker (START; www.startinstem.org), a robust online evaluation tool for engaging students about their own professional development in STEM (science, technology, engineering, and mathematics). It provides students with immediate, tailored e-feedback based on their results aimed at supporting their STEM development. It also provides STEM programs and schools with summary data in real time, with de-identifiable data filterable based on student demographics. The project identified common needs for assessment and defined informatics architecture to support reporting outputs, data security, governance structures, and linkage with other projects and data sources. The project summarized recommendations for inclusive demographic data practices to support characterization of historically underrepresented populations in STEM (i.e., disaggregated racial/ethnic groups, disability, language, disadvantaged background, gender identity, and sexual orientation identity) using modular approaches designed to support student autonomy and privacy when implemented by programs across geopolitical settings. Finally, START can be used for cross-sectional or longitudinal data collection, with anonymous and identifiable approaches governed by an overarching Institutional Review Board (OHSU IRB #22889) to support data collection by STEM programs and schools nationwide for biomedical workforce development.

*Funder:* SEPA

**Research Experiences for Students & Teachers, set 1 of 3: Wednesday, 1:30 – 2:15 pm**

**Room: Tucson**

**UMB RAMP: UMB Research And Mentoring Program to develop skills and promote interest in STEM fields through hands-on exposure to academic research among West Baltimore Youth**

*Authors:* Anna Pudder, Linda Horn, Cara Felter, Bret Hassel, Elizabeth A. Dennis; University of Maryland School of Medicine

This poster describes the implementation of a pilot curriculum introducing basic, clinical and translational research and hands on training for rising 11th- & 12th graders in Baltimore City. Scholars received 5 hours of daily instruction in basic science lab and clinical research skills through an interdisciplinary team of UMB faculty and graduate and undergraduate student mentors recruited from undergraduate and graduate programs in the Baltimore area. Pre- and post-surveys assessed research interest and sense of belonging. Of the 7 scholars who completed the program, average attendance was 87%, or 22 out of 25 total days. By the end of summer, 100% of scholars identified themselves as a student researcher. Prior to participating in RAMP, 75% of students reported they were “not sure” or that they “might be” interested in research as a career. At the end of the program, 71% agreed with the statement that a career in research might be a good fit for them. Completion of the first year of the program serves as a “ramp” to the next step, a 5-week lab or research-based experience with UMB faculty members in summer 2024.

*Funder:* SEPA

**Environmental Neuroscience for All: A participatory science program and platform for students, teachers, scientists, and communities**

*Authors:* Suzanne Dikker, New York University; Camillia Matuk, New York University

Environmental Neuroscience for All uses a combination of online and in-person tools and an open science approach to support high school students in carrying out their own original research projects focusing on environmental neuroscience, a fast-growing field of research at the intersection of behavioral science and more ‘traditional’ STEM fields that recognizes the critical role of human brain and behavioral science in better understanding the impact that the environment has on humans, and the impact that humans have on our environment. We will present data from our first-year pilot and first iterations of our materials and web-based platform to support authentic community science research spearheaded by teens in a network of environmental neuroscientists, community organizations, and student peers - both locally and nationwide, and both in-person and online. These tools will connect geographically and socio-economically diverse learners and communities; and in doing so create pathways toward more transparent, accessible, and inclusive environmental science - and contribute to building the foundations for a STEM workforce that approaches environmental challenges as a collective, interdisciplinary effort.

*Funder:* SEPA

**New York City Virus Hunters – A Community Science Initiative**

*Authors:* Christine Marizzi, BioBus; Philip Meade, Icahn School of Medicine at Mount Sinai; Florian Krammer, Icahn School of Medicine at Mount Sinai

The goal of the New York City Virus Hunters (NYCVH) project is to increase students’ understanding and interest in science through active participation in the first large-scale surveillance initiative targeting avian viruses like influenza viruses (AIV) and avian paramyxoviruses (APMV, also known as Newcastle disease virus) conducted in an urban area – New York City, New York. Each year middle and high school teachers will join (safe) sampling events under expert guidance of project staff. In addition, high school students from historically underrepresented communities in science will be trained to spearhead the initiative as Junior Research Scientists who will join the NYCVH as interns over the academic year and get an intensive training in sampling, nucleic acid detection, sequencing, phylogenetic analysis and virology in general to become the next generation of leading virologists. With Icahn School of Medicine at Mount Sinai, BioBus and plus a network of scientists from academic institutions and wildlife rehabilitators, those students will be supported throughout their research process – study design, sample collection, sample processing, analyzing results, and presenting their research at symposia

Curriculum materials will be disseminated via a dedicated program website and presented at conferences. Project description and outcomes will be disseminated at student research symposia, public events, conferences, open-access data repositories and in publications in peer-reviewed journals.

*Funder:* SEPA

**Bioinformatics research using existing data sets: a program for high school students**

*Authors:* Kristine M. Wylie, Washington University; Lauren Johnson, Washington University; James Skeath, Washington University

The Washington University SEPA program partners with Saint Louis high schools to increase exposure to bioinformatics/genomics research, with the goal of increasing participation of historically excluded groups in STEM careers. We host a summer program that provides the opportunity for students to learn about an ongoing research project and to analyze existing genomics data sets using bioinformatics tools under the guidance of graduate student mentors. In summer 2023, topics discussed included: considerations for human subjects research, health disparities, genes/genomes, microbiomes, and model organisms. Bioinformatics concepts and hands-on activities included: bacterial culture, DNA extraction, metagenomic sequencing, sequence alignment, assembly, comparative genomics, and statistical methods for comparing groups. Program evaluators found that both the high school students and their graduate student mentors were satisfied with the program; all students indicated the program met or exceeded expectations, and all mentors indicated they would like to participate in the program again. Students reported that they were provided good role models, developed competence in data analysis, and were encouraged to contribute independent, original thought. We will host another research program this summer that focuses on bioinformatics analysis of existing data sets, incorporating feedback from the students and mentors to improve the program.

*Funder:* SEPA

**Statewide cancer research training for youth and enhancements when paired with a peer-based Leadership Training Program in Cancer Research Mentoring**

*Authors:* Amanda Braley, Oregon Health & Science University; Lisa K. Marriott, Oregon Health & Science University; Susan Shugerman, Oregon Health & Science University; Lynda Crocker Daniel, Oregon Health & Science University; Azalea Martinez, Oregon Health & Science University; Kaitlin Greene, Oregon Health & Science University; Dest, Alex, Oregon Health & Science University; Zebroski, Derrik, Oregon Health & Science University; Sadie McIver, Oregon Health & Science University; Sipelii, Motutama, Oregon Health & Science University Connie Tran, Portland State University and Oregon Health and Science University; Alex Vazquez-Cortes, Portland State University and Oregon Health and Science University; Dierdre McKay, Eastern Oregon University and Oregon Health and Science University; Brian J. Druker, Oregon Health & Science University; Jackilen Shannon, Oregon Health & Science University

The Knight Scholars Program provides mentored training in cancer research for underrepresented high school and undergraduate students in Oregon. Scholars receive training over three successive summers that build in duration and intensity. Scholars learn about interprofessional settings where cancer research occurs through shadowing experiences in their home communities (i.e., clinical, public health, and outreach). They also receive residential research experiences at a comprehensive cancer center (Oregon Health & Science University in Portland) that help scholars identify areas of interest for research placements the following summer (i.e., across laboratory, data science, clinical research, and community settings). Scholars are supported by an interprofessional near-peer mentoring team participating in a Leadership Training Program in Cancer Research Mentoring, which provides full-time (10 week) and part-time funded training in youth-focused research mentorship. The programs have been tested across virtual, in person, and hybrid settings statewide, with scholar and peer mentor impacts measured using surveys, reflections, photovoice, and focus groups. Trainees share outcomes through community research projects, research posters, professional portfolio development (e.g., resume, CV, online presence), and individual development plans that help trainees document their cancer training experiences and identify next steps as biomedical scientists.

*Funder:* NCI YES R25

**The CIRCLE Program: A Distance Research Opportunity for Students Underrepresented in Science & Health Careers**

*Authors:* Kelley Withy, MD, PhD ; Erica L. Davis, MSNP, GCDF, GAL, MHFA-C ; Zachary Oglesby, University of Hawai'i at Manoa

The Consortium for Increasing Research and Collaborative Learning Experiences (CIRCLE) program in 2023 achieved remarkable progress toward its goals of engaging students from the US Pacific region in scientific research. With the inclusion of a new Principal Investigator, the program expanded to host eight diverse projects covering areas from basic to social sciences, including Zebrafish Modeling and Air Quality Particulate Matter, among others. Through 115 hours of online lab meetings and 163 hours of mentorship, CIRCLE fostered an environment where 49 students successfully completed their projects, showcasing their findings through posters and symposium presentations. This engagement was facilitated using modern communication platforms like Zoom, Slack, and Discord, enhancing the learning experience and mentor-student interaction. Additionally, CIRCLE offered professional development workshops and foundational research skills training, significantly contributing to the students' educational journey. The program's efforts were shared at the NIH SciEd Conference, highlighting its commitment to broadening scientific awareness and fostering a diverse research workforce. Through these achievements, CIRCLE has made significant strides in promoting scientific inquiry and professional growth among students, preparing them for advanced research opportunities and a future in the healthcare sector.

*Funder:* SEPA

**Science Teaching & Learning, set 1 of 2: Wednesday, 1:30 – 2:15 pm**

**Room: Wasatch**

**Strengths and Challenges in Scientific Argumentation Students with Disabilities Experience**

*Authors:* Delinda van Garderen, University of Missouri; William Folk, University of Missouri

The ability to make evidence-based claims (argumentation) is a key shared practice of the Common Core State Standards and the Next Generation Science Standards. For students with disabilities (SWD), there has been a dearth of research examining their ability to make scientific arguments (Moon et al. 2012). What is known is that SWD when engaged in argumentation tend to describe what occurred as opposed to why (Klein & Rose, 2010) and often draw on their own prior knowledge in critiquing the claims and do more poorly on the reasoning tasks as compared to their peers without disabilities (De La Paz & Levin, 2018). Our poster will present quantitative and qualitative findings from a study that examined 75 SWD written argumentation as a part of a larger study designed to assess growth in argumentation following a multimodal text set intervention that targeted the development of students’ argumentation skills. Components of claim-evidence-reasoning (CER) that SWDs mastered and found challenging will be highlighted. Implications for instruction will be provided.

*Funder:* SEPA

**ESTA Environmental Science Through Art: Bringing state-of-the-art environmental health education to youth in agricultural communities**

*Authors:* Amir Attia, California State University Monterey Bay (CSUMB); Asa Bradman, UC Merced (Co-PI); Brenda Eskenazi, CSUMB; Eros Gonzalez-Lopez, CSUMB; Kariya Hunter, CSUMB; Enid Ryce, CSUMB (Co-PI); Juliana Schuster, CSUMB; Corin Slown, CSUMB (PI); Kenneth Tran, CSUMB

ESTA is a research and education program housed at California State University Monterey Bay and in partnership with:

•CHAMACOS (Center for the Health Assessment of •Mothers and Children of Salinas)

•The Monterey Bay Aquarium

•The Monterey County Office of Education

•Artists Ink, a local artist organization

•The University of California, Merced

ESTA is currently beginning its fourth year of a five year NIH-SEPA grant. This year’s focus was on agricultural practices, the ocean, and human health. Projects have been leveraged to communicate key environmental health concepts to other students and the public, including their community, media, and policymakers. Students have received paid summer internships, engaged in science education training, and produced high quality art products.

*Funder:* SEPA

**St. Jude Virtual STEMM Academy**

*Authors:* Kyly Bichsel, Tingting Yang, Amanda Etherington, Torrean Johnson, and Kate Ayers, St. Jude Children's Research Hospital

A need assessment was done to identify the gap of limited learning resources to engage pre-college students in data science and health professions. The Virtual STEMM Academy was formed to develop an online learning platform and curriculum targeted at high school students looking for training in data science. This platform provides St. Jude recruitment opportunities that will reach populations currently underrepresented in biomedical research. Our poster introduces the design and development process of the program and reports the findings from a pilot study.

*Funder:* St. Jude Virtual STEMM Academy

**EMPOWER: Enacting Materials to Promote OWnership, Engagement and Relevance**

*Authors:* *Monica Ko; Barbara Hug*

Fostering locally relevant and community-centered forms of science learning that develop students’ critical science agency problematizes a “one-size-fits-all” model of teacher learning; teachers must examine how community needs and resources, local inequities and justice issues, and curriculum materials can converge to design novel learning opportunities for science learners. This poster presents the core commitments of EMPOWER, a cross-institutional effort that aims to support teachers' sensemaking and adaptations of curriculum materials to promote student ownership, engagement, and relevance at multiple sites across the U.S.

*Funder:* SEPA

**Teacher Professional Development, set 1 of 3: Wednesday, 1:30 – 2:15 pm**

**Room: Sawtooth**

**Early Implementation and Outcomes of Pathways for Authentic Teaching of Health Sciences (PATHS) Program**

*Authors:* Lisa Abrams, Elizabeth Edmonson, Hillary Parkhouse, Yonella Demars & Georgia Youngquest, Virginia Commonwealth University

Pathways for Authentic Teaching of Health Sciences (PATHS) is a five-year project designed to build health literacy knowledge, skills and career awareness of health professions. PATHS primary aim is to develop, implement, and test a model program that provides culturally relevant curriculum and pedagogical training to secondary teachers (grades 7 through 12) that supports student learning of health professions, develops an understanding of social determinants of health (SDH), and builds skill with large data sets through medical tools related to precision health. The goal is to increase interest in STEM-related content areas and career possibilities. This year's poster describes the PATHS professional development, preliminary teacher outcomes, and the addition of curricular co-design approaches to enhance teacher learning.

*Funder:* SEPA

**The High School Research Initiative: PD for Rural Teachers, Inquiry Curriculum, and More**

*Authors:* Gwen Stovall, The University of Texas at Austin; Deanna Buckley, The University of Texas at Austin; Bailey Williams, The University of Texas at Austin

The HRI provides virtual summer professional development and ongoing support for rural teachers, inquiry curriculum based on current STEM research at UT-Austin, trained undergraduate mentor support, and materials and small equipment. To date the following curricular modules have been implemented in classrooms across Texas: Caffeinated Coli, Fish Behavior, Habitat Scouts, and Virtual Drug Screening. Our goals are to create a supportive network of practicing teachers with emerging teacher leaders, undergraduate mentors, and faculty research educators.

*Funder:* SEPA

**Hexacago Health Academy 2.0: Teacher Professional Development for Game Design and Systems Thinking**

*Authors:* Vanya Manthena, Ci3 at University of Chicago; Yul A Stites, Ci3 at University of Chicago; Madeline Quasebarth, Ci3 at University of Chicago; Jessie Henry, Ci3 at University of Chicago; Lee Hasselbacher, Ci3 at University of Chicago; Patrick Jagoda, University of Chicago

Hexacago Health Academy (HHA) 2.0 is an interactive summer intervention designed to increase STEM/health interest among youth of color. During 2021 and 2022, HHA’s approach showed increased interest in STEM/health careers among student participants. In 2023, we sought to broaden our impact in classroom settings by creating and implementing a professional development (PD) curriculum for high school teachers in Chicagoland. Seven teachers participated in a week-long PD exploring approaches to game design and engaging students' systems thinking, an approach to problem-solving that acknowledges a broader dynamic structure. Teachers represented various disciplines including Math, English, Biology, Chemistry, and Health/Physical Education.

Results demonstrated that teachers were satisfied with the PD and eager to implement what they had learned in their classrooms. In follow-up interviews, all teachers mentioned that the game design curriculum would be feasible to implement during the following school year. Most teachers thought that it would require at least 10 classroom hours to implement the curriculum for a class size of 20-25 students. Teachers described the PD as fun, supportive, and inspirational; and were excited to implement in their classrooms.

*Funder:* SEPA

**The ABC Project: The CoronaCURE in a Nutshell, a primer for teacher research experiences in bioinformatics**

*Authors:* Jessica Siltberg-Liberles, Florida International University; Janelle Nunez-Castilla, Florida International University; Laird Kramer, Florida International University

To kick-start the professional development for high school biology teachers, the Authentic Bioinformatics in the Classroom (ABC) Project developed CoronaCURE in a Nutshell, a 2-hour problem-based learning activity that provides an overview of the coming research experience. The activity, referred to as CoronaCURE in a Nutshell, covers the research topic of vaccine and antiviral targets in Coronaviruses. By emphasizing concepts in biology such as proteins and evolution through the lens of fundamental bioinformatics, it guides participants in understanding which factors to consider for broad neutralization of multiple coronaviruses. The activity is a popular element of our teacher PD and an easy way to engage teachers in bioinformatics. The CoronaCURE in a Nutshell is integrated with the ABC high school biology bioinformatics curriculum. Here, we present the CoronaCURE in a Nutshell and provide an opportunity for you test it out. If you think the activity can work for the teachers you work with, we are happy to share it with you.

*Funder:* SEPA

**Poster Roundtables Session 2: Wednesday, May 29, 4:00-4:45pm**

**Broadening Participation, set 2 of 2: Wednesday, 4:00 – 4:55 pm**

**Room: Flagstaff**

**Lessons Learned Working with Undergraduates to Engage Middle Schoolers**

*Authors:* Jamie Cornish, Montana State University; Nora Smith, Montana State University; Becky Hammack, Purdue University, Tugba Boz, Purdue University

My Home, My Health: Place-Based Public Health Resources for Rural Educators trained undergraduates to create lessons for middle school youth and implement them at summer camps for underserved and tuition paying youth. The project found that the undergraduate participants increased their confidence and interest in science outreach, and they enhanced their understanding of disease ecology. They created lessons that were effective with all campers regardless of race or socioeconomic status. Campers were very interested in disease ecology and their understanding of it significantly improved. Campers’ interest and confidence in taking science classes and pursuing STEM and careers also increased.

*Funder:* SEPA

**The Great Diseases: Bridging biomedical career exploration, competency building and mentoring**

*Authors:* Berri Jacque, Tufts University School of Medicine; Karina Meiri, Tufts University School of Medicine; Valerie Solon, Tufts University School of Medicine; Revati Masilamani, Tufts University School of Medicine; Elizabeth Genne-Bacon, Tufts University School of Medicine; Carla Maisonet, Tufts University School of Medicine; Katie Malanson, Tufts University School of Medicine; EmilyKate McDonough; Russ Faux , Davis Square Associates; Kelly Gordon, Boston Public Schools; Denise Puopolo, Boston Public Schools; Boston Public Schools; Amber Kell, Boston Public Schools; Jasmine Juo, Brookline Public Schools; Wen Sailer, Brookline Public Schools

Building on our enduring co-design partnership with Boston area teachers we have created a continuum of opportunities that integrate career awareness with building critical competencies like data-based collaborative problem solving. We have used an iterative design-based research approach to create: (1) BioScann - Classroom ready digital multi-role case studies in which students explore biomedical career roles and use data to solve problems. Cases include - HIV Drug Development, Stress and Public Health Campaigns, and HPV Vaccine Development. (2) Mini-Med-Honors - online dual-enrollment courses that incorporate college readiness skills with learning about cutting-edge biomedicine. (3) STEM+M-CONNECT – a residential summer program that combines biomedical learning, near-peer mentoring and internships to offer college experiences. Across the three strands of the project, our studies aim to better understand the complex interaction of factors both inside and outside the classroom that impact career interest and persistence, with a focus on broadening participation in STEM+M. The overarching research goal is to advance models and measures for short-term interventions that are predictive of career selection and persistence. Join us to lean about our curricular materials, student and teacher outcomes, and lessons learned!

*Funder:* SEPA

**Exploring Big Data with *All of Us* Data Browser**

*Authors:* Genetic Science Learning Center Team, University of Utah

The *All of Us* Research Program is a historic, longitudinal effort to gather data from one million or more people living in the United States to accelerate research and improve health. By analyzing differences in lifestyle, environment, and biology, the program hopes that researchers will develop precision treatment, prevention and healthcare. The program engages participant communities that reflect the diversity of the United States including communities that have been historically underrepresented in biomedical research. Guided by the core values of diversity, transparency, and accessibility, the *All of Us* Research Program is making the data available to the public via the *All of Us* Data Browser. It provides aggregate-level data and a view of the types of data that are being collected to inform health research.

We’ll discuss print and multimedia curriculum materials co-designed with teachers and community members that: introduce students and the general public to “big data” and how it is used in research, review the types of data collected by the *All of Us* Research Program, and engage students and community members in exploring the Data Browser to answer their own questions about health in the United States

*Funder: All of Us* Research Program, NIH

**Encouraging Excellence: Health Science Education in Native American Communities**

*Authors:* Liliana Bronner, Kim Soper, Shrawan Kumar, Robert Pawloski, Jolene Johnson, Maurice Godfrey, University of Nebraska Medical Center

The long-term goals of this project are to promote student interest in the sciences, foster a more science-literate public, and ultimately increase the number of Native Americans entering health and science careers. Here, we will describe several efforts to help accomplish these goals. 1) Development of an interactive multimedia module to introduce academic vocabulary to middle and high school students. 2) Plans for middle school summer health and science fun camp in collaboration with the University of Oklahoma YES program. This experience will bring students from Nebraska and South Dakota to Norman, Oklahoma, and their Native-centered research and culture programs. 3) Development of aquaponics-based curricula. 4) Stories of Indigenous people with cancer.

*Funder:* SEPA

**SciTrek: How Science Works**

*Author:* Norbert Reich, University of California Santa Barbara

SciTrek is an outreach bringing five to seven university students into local 2nd-12th grade classrooms to run five to seven day inquiries into diverse STEM topics. The program depends on 300-400 university students and reaches 2000-3000 students each year. Teachers are provided professional development, particularly at the elementary level, all experimental materials, and workbooks. Modules cover chemistry, biology, physics and math. We have partnered with other colleges (SBCC) and universities (CSUCI and CSUSLO) to launch SciTrek programs elsewhere. Our assessments and evaluations show that the program improves critical thinking in the context of science practices as well as students' attitudes towards science and their role in science.

*Funders:* SEPA, Department of Defense

**The Brain Explorer Academy: Empowering Underserved High School Students for STEM Success Through Neuroscience Education**

*Authors:* Raymond D. Villareal, University of California, Irvine Center for the Neurobiology of Learning and Memory; Morgan Coburn, University of California, Irvine Center for the Neurobiology of Learning and Memory; Manuella Oliveira Yassa, University of California, Irvine Center for the Neurobiology of Learning and Memory

Diversity is critical to innovation and the advancement of our society. Yet despite our best efforts as a nation, the United States has not been able to achieve STEM workforce diversity goals, which have been long attributed to the failure of the “academic pipeline” to recruit and retain students from underrepresented minorities (URM), a phenomenon often described as a “leaky pipeline”. Addressing this challenge will require innovative, multi- pronged interventions that concurrently address social and environmental contributors to disparities. To address the challenges in STEM diversity, we propose the Brain Explorer Academy (BEA), a comprehensive, multi-year, socio-ecological informal science education program that uses neuroscience to instill curiosity and foster interest in STEM careers. The BEA will marshal high school students in a Title 1 School through a multi-stage intervention that fosters interest in STEM, knowledge and skill development, critical thinking, scientific communication, and quantitative/analytical competencies. We will test the hypothesis that the staged approach of the BEA, which proceeds from highly structured learning in the first year, to highly individualized mentoring in the third year, will lead competency development, increased in knowledge, attitudes and practice related to STEM, and workforce capacity building. In addition to evaluating the program using an independent third-party evaluator , we will generate a repository of digital and material resources to be used to create a “program-in-a- box” that can be widely implemented, constantly improved and reproduced at other institutions.

*Funder:* SEPA

**Informal Science Education, set 2 of 3: Wednesday, 4:00 – 4:55 pm**

**Room: Sun Valley**

**From virtual exhibits to a mobile game: Engaging learners with evolution beyond the walls of scientific collection**

*Authors:* Lisa White, University of California Museum of Paleontology; Anastasia Thanukos, University of California Museum of Paleontology; Teresa MacDonald, University of Kansas Natural History Museum

The University of California Museum of Paleontology is a major paleontological scientific collection with a long history of engaging learners through online experiences and materials, including on the topic of evolutionary biology and its applications to medicine, but with no public galleries. In the current NIH-SEPA project, the team pivoted, developing a physical, mobile exhibit on this topic with our partner institutions. VENOMventure transports English- and Spanish-speaking families with kids ages 8 and up to a fantastical research facility where they work together to solve a biomedical mystery and learn about key concepts in evolutionary biology. Teams play the escape-style game inside a pop-up inflatable room that travels to libraries, natural history museums, and other venues. In this poster, we describe our motivations in developing the project, the strengths our museum and partnerships offer the project, and the risks/rewards associated with making the leap from virtual to mobile exhibits.

*Funder:* SEPA

**Project SCORE (Student Centered Outcomes Research Experience) – The Experience of The Near-Peer Mentor**

*Authors:* Tess Johnson Department of Pharmacy Administration, School of Pharmacy University of Mississippi Caroline Compretta Department of Preventive Medicine, University of Mississippi Medical Center Allison Ford-Wade Department of Health, Exercise Science & Recreation Management, the School of Applied Sciences, University of Mississippi Erin Dehon Department of Emergency Medicine, University of Mississippi Medical Center Murrell Godfrey Department of Chemistry, the Graduate School, University of Mississippi Dylan Barker Department of Health, Exercise Science & Recreation Management, the School of Applied Sciences, University of Mississippi Lorna Fornea Department of Health, Exercise Science & Recreation Management, the School of Applied Sciences, University of Mississippi Makenna Riley Department of Political Science, School of Liberal Arts, University of Mississippi Savannah Wehman Department of Teacher Education, School of Education, University of Mississippi Breanna Wade Department of Preventive Medicine, University of Mississippi Medical Center Quest Whalen Department of Biostatistics and Data Science, School of Population Health, University of Mississippi Medical Center Elizabeth Gordineer Department of Neurosurgery, University of Mississippi Medical Center Marie Barnard Department of Pharmacy Administration, School of Pharmacy University of Mississippi

Project SCORE (Student Centered Outcomes Research Experience) engages Mississippi adolescents (SCORE Scholars) in a youth participatory action research (YPAR) effort designed to engage students, promote health literacy, increase awareness of health disparities, and diversify the health sciences pipeline. Health sciences undergraduate and graduate students lead the program and introduce the SCORE Scholars to topics related to public health, including health literacy, population health, and health disparities. An introduction to the scientific method and research methodology, including problem identification and the development of good research questions, prepares the SCORE Scholars to develop a research agenda.

Through engagement with Near-peer mentors (NPM), SCORE Scholars are guided towards developing a research agenda and cultivating interest in academic and research careers. The NPM approach, facilitated by undergraduate and graduate students, offers numerous benefits for both mentors and mentees. Close proximity in age and educational level allows mentees to more readily envision themselves in the mentor's role, which is particularly crucial for underserved minorities lacking adequate role models. Recognized widely as effective in personal and professional development, mentoring plays a pivotal role in the success of the program. NPM students undergo comprehensive training facilitated by the investigation team to ensure effective mentorship. Topics covered include understanding the role of a near-peer mentor, strategies for promoting classroom engagement while maintaining boundaries, fostering consistency, effective communication techniques, embracing cultural diversity and inclusivity, and the significance of community-engaged research.

*Funder:* SEPA

**Distance Learning Experiences that Promote Lab and Data Science for K-12 Students**

*Authors:* Keisha Burnett, University of Tennessee Health Science Center; Jacen Moore, University of Tennessee Health Science Center; Rebecca Reynolds, University of Tennessee Health Science Center; Marcia Sharp, University of Tennessee Health Science Center; Simpfronia Taylor, University of Tennessee at Martin Ripley Center.

The High School to Health Care (HS2HC) grant program focuses on student recruitment from rural areas to lab and data science health careers. One approach we have used to disseminate our program is creating professional learning networks (PLN) that involve sharing expertise and strategies. PLNs multi-directional collaborations between teachers, school systems, districts, and external partners. The HS2HC team created an external PLN with the Hart Memorial Central Library in the Osceola Library System in central Florida. Our data science content expert provided instruction on the importance of identifying and using high-quality health information to improve health literacy. The HS2HC PLN promoted interest in learning about STEM fields, engaged students in hands-on activities, and created a model for using distance learning in STEM instruction pertaining to lab and data sciences.

*Funder:* SEPA

**Science Journeys**

*Authors:* Rachel Smilow, Children's National Hospital; Naomi Luban, Children's National Hospital, George Washington University; Annika Hvide, Children's National Hospital; Nicholas Apato, Children's National Hospital; Lisa Bochey, Children's National Hospital

Science Journeys (“Journeys”) engages a unique audience of learners: children and families navigating hospitalization accompanied by a loss of educational opportunities. ”Journeys” incorporates lessons learned from our previously funded NIH grant based in the out-of-school time setting of public libraries, community centers and in home hands on STEM programming. Participants in “Journeys” develop STEM knowledge and skills, improving their understanding of their health conditions, increasing their health agency and engagement with their healthcare team.

*Funder:* SEPA

**Citizen DNA Barcode Network: A Community-based Infrastructure for Monitoring Biodiversity and Disease Vectors**

*Authors:* Jeffry Petracca; Cris Marco; Daniel Jacobs; Sue Lauter; David A. Micklos, Cold Spring Harbor Laboratory DNA Learning Center

Citizen DNA Barcode Network (CDBN) adapts hands-on DNA barcoding methods from the Cold Spring Harbor Laboratory DNA Learning Center’s previous SEPA-funded projects, including Barcode Long Island, to engage citizen scientists in informal settings. DNA barcoding uses a marker DNA sequence to distinguish one species from another in much the same way that a universal product code (UPC) identifies a consumer product. CDBN equips visitors to science and nature centers and members of community conservation groups to inventory ants, beetles, and mosquitoes in local habitats as part of national campaigns. These insect groups include bioindicators of environmental change, disease vectors, and economically important species whose ranges are in flux due to environmental pressures such as global climate change. Through hands-on experimentation, citizen scientists contribute new information to global biodiversity databases and improve range maps that show how species are responding to these changes. Evaluation of the effects of participation on citizen scientists—including comparisons to other national STEM activities—will be highlighted on our poster alongside program activities, products, and results.

*Funder:* SEPA

**BioBridge Prepares Students to Bridge into High School Biology through Cancer Research Education**

*Authors:* Michelle S. Johnson, University of Alabama at Birmingham; Kathy C. Haynie, Haynie Research and Evaluation; Lalita A. Shevde, University of Alabama at Birmingham

The underrepresentation of minority students in many biomedical careers can be attributed to the lack of the academic and social readiness needed for high school Science, Technology, Engineering, and Math (STEM) success. Here, we describe BioBridge, a one-week summer STEM outreach developed to engage and increase the readiness of students to succeed in Science, Technology, Engineering, and Math (STEM). BioBridge is an inquiry-based 5-day summer camp offering interactive experiences to increase the ability of students to transition into high school biology and introduce them to cancer biology and biomedical research and careers. BioBridge focused on increasing cancer biology awareness among the students’ families by encouraging them to communicate what they learned in the sessions with their families. BioBridge participants significantly increased their understanding of both biology and cancer biology. They reported that BioBridge gave them the confidence to talk about cancer and, ultimately, other health issues with their families. Over the past three summers, 97 students have participated in BioBridge. Participant content knowledge assessment scores increased from an average of 67% correct pre-camp to 86% correct post-camp. Finally, using a video platform, participants created video discussions of cancer biology content learned during the one-week camp. *Funder:* SEPA, NCI YES R25

**Research & Evaluation, set 2 of 2: Wednesday, 4:00 – 4:55 pm**

**Room: Snowbasin**

**UPWARDS Program: Finding Value in Training Programs for Underserved Students**

*Authors:* Khandan Keyomarsi, Ph.D.; Stephanie S. Watowich, Ph.D.; Hannah Wingate, Ph.D.; Kara Lewis, D.PH.; Valoree Solis Jahan-Tigh, MBA, MD Anderson Cancer Center

The UPWARDS Program is designed to provide hands-on lab-based research experience to underserved high school and undergraduate students through year-round and summer training programs. By reducing the barriers in underserved students’ pursuit and success in STEM, combined with our carefully curated training curriculum that includes both didactic learning as well as wet-bench basic and translational research, our goal is to provide a transformative training experience to students thereby providing a solid foundation to continue their academic and professional pursuits in not only STEM but in cancer research. Through our annual metric collection, our team tracks the academic and professional outcomes of the 625 students that have participated in our training programs. Our analysis has revealed that there is immense value in our specific training program, as the percentage of underserved students that completed their bachelors in STEM was equivalent to non-underserved students (97.4% vs 97.2%). Notably, our underserved students were more likely to earn research-based doctoral degrees versus non-underserved students (49.6% vs 28%). Individuals in the latter group were more likely to pursue a clinical-based doctoral degree. To grow the STEM pipelines, it is critical for training opportunities, like the UPWARDS program, that serve underserved trainees continue to be offered.

*Funder:* *NCI YES R25*

**Community-engaged research partnerships for building capacity and training in inclusive data science**

*Authors:* Stephanie E. Paris, Oregon Health & Science University; Shanthia N. Espinosa, Oregon Health & Science University; Amanda B. Braley, Oregon Health & Science University; Aaron Raz Link, Oregon Health & Science University; and Lisa K. Marriott, Oregon Health & Science University.

Science, technology, engineering, and mathematics (STEM) training programs enhance education and support for students, with an emphasis on measuring access, engagement, and retention. Demographic data enable programs to understand their impact. This SEPA expands data science training for middle and high school students and facilitates connection across a nationwide network of multidisciplinary partners to accelerate educational research, scholarship, and training that supports authentic representation of student identities in STEM. Through the lens of data science, this project will 1) identify considerations for inclusive demographic data collection and responsible reporting; 2) establish a training collaborative that aligns qualitative research with data science outputs to enhance authentic representation of a diverse biomedical workforce; and 3) characterize how demographic data are used to make decisions and inform practice. This project collaborates with the SciEd community to share data science considerations that promote diversity, equity, inclusion, and accessibility for biomedical workforce development.

*Funder:* SEPA

**The Impact of the Metagenomics Education Partnership Project on Students**

*Authors:* Sunha Kim, University at Buffalo (UB); Weiyi Ding, UB; Steve Koury, UB; Sandra Small, UB

The NIH Science Education Partnership Award (SEPA) Metagenomics Education Partnership Project (MEPP) at the University of Buffalo engages in community-linked citizen science, focusing on metagenomic analyses of water samples in Western New York with underserved high school students. As part of this project, students participated in sequencing and analyzing a microbial genome, culminating in presenting their findings at a capstone event during the academic year. We analyzed student survey responses from 2022-2023, comparing participating and non-participating students. Utilizing various statistical techniques, including multivariate structural equations models (SEM), we applied methods such as appropriate treatment for missing data and robust estimation techniques. Participation in MEPP resulted in increased STEM efficacy, even after controlling for covariates. MEPP positively influenced student science self-efficacy, with no discernible differential effect based on ethnicity/race and gender. Thus, participating students demonstrated higher levels of science self-efficacy compared to non-participants, irrespective of gender and race. Additionally, participating students exhibited a stronger science identity than non-participants. These findings suggest that SEPA programs, such as MEPP, can enhance student outcomes and contribute to the advancement of STEM education and workforce development.

*Funder:* SEPA

**Qualitative Program Assessment using Photovoice: Underrepresented high school students continue to develop autonomy, competency, and relatedness across the tiers of the Knight Scholars Program.**

*Authors:* Dierdre McKay, Eastern Oregon University and Oregon Health and Sciences University; Connie Tran, Portland State University and Oregon Health and Sciences University; Alex Vazquez-Cortes, Portland State University and Oregon Health and Sciences University; Bridget Bugla, Portland State University and Oregon Health and Sciences University; Tiffany Bui, Portland State University and Oregon Health and Sciences University; Kaisa Holt, Portland State University and Oregon Health and Sciences University; Anthony Phan, Portland State University and Oregon Health and Sciences University; Clare Hansen, Portland State University and Oregon Health and Sciences University; Amy Lin, Portland State University Oregon Health and Sciences University; Amanda Braley, Knight Cancer Institute Oregon Health and Sciences University; and Lisa Marriott Ph.D, Portland State University and Oregon Health and Sciences University.

The three-summer-long Knight Scholars Program (KSP) supports underrepresented high school students from across the state of Oregon who are pursuing a research career by teaching them the tools they need to succeed. Self-determination theory (SDT) guided the development of an inclusive learning environment to strengthen the high schoolers' motivation to pursue research careers. This included personal and professional support from undergraduate and graduate peer mentors, who share identities and experiences with the scholars. The impact of the program’s SDT-based structure on participants’ long-term motivation in pursuing a research career was assessed qualitatively using Photovoice methodology. Photovoice utilizes the combination of a photo and the description of it to create an authentic and meaningful dialog sharing knowledge and experiences. Analysis of Photovoice presentations created by scholars about their overall experiences in the Immersion and Intensive programs revealed that participants' autonomy, competency, and relatedness heavily correlated with the type of experience they had in the program. A positive correlation between these three elements was also noted. These findings, discussed in the context of supporting diversity, equity, inclusion, and accessibility goals of programs, highlight the need for broadened and systematic trainee support.

*Funder:* NCI YES R25, Kuni Foundation

**Research Experiences for Students & Teachers, set 2 of 3: Wednesday, 4:00 – 4:55 pm**

**Room: Tucson**

**The Metagenomics Education Partnership: Harnessing the Power of Microbial Genome Sequencing and Big Data with High School Students and Teachers**

*Authors:* Stephen T. Koury, University at Buffalo; Sunha Kim, University at Buffalo; Sandra Small, University at Buffalo; Jonathan Bard, University at Buffalo; Norma Nowak, University at Buffalo; Weiyi Ding, University at Buffalo

The Metagenomics Education Partnership immerses high school students and teachers within a citizen science research project focused on assessment of the health of waterways around Western New York. Oxford Nanopore sequencing is used to 1) provide a snapshot of the microbial community compositions of those waterways, and 2) to determine a complete genomic sequence of one microbial genome grown from their sample. The project promotes genomics education in workforce development by informing high school students, educators and community organizations how genomics can integrate into future STEM careers. Metagenomic results are used by student to determine whether bacteria in the water are normal flora or whether their presence suggest issues with the health of the waterway under investigation. Whole genome sequencing results are used to generate a draft genome that can be uploaded to GenBank. Teachers can subsequently use the genome to perform bioinformatics research with future students using tools developed in our previous SEPA. A capstone event on May 21, 2024 will allow approximately 150 students plus their teachers to present their research findings and to learn more about academic programs and careers in genetics/genomics. Updated results of participant research and participant evaluation will her presented.

*Funder:* SEPA

**Immersive research experiences for educators: Lessons for the classroom**

*Authors:* Megan Mekinda, University of Chicago; Michael Dixon, Dewey School of Excellence; Sonia Hernandez, University of Chicago; Rosemary Huggins, University of Chicago; Alex Hurtado, Trinity High School; Joseph O’Hara, Lindblom Math and Science Academy; Eileen Dolan, University of Chicago

This poster reports the methods, implementation, and outcomes of three novel curricular activities designed by educators in the Chicago EYES on Cancer program at the University of Chicago (R25 YES). The curricular activities are derived from teachers’ immersive cancer research experiences with UChicago faculty. They include a lung cancer case study and microscopy lab for middle school students; a career exploration opportunity in medical physics for high school physics students; and a computational biology field trip for high school biology students. Overall, teachers report increased confidence in scientific inquiry, technical research skills, and subject matter expertise. Students report a deeper understanding of the subject material and greater awareness of biomedical careers. These curricula demonstrate the broad impact that immersive research experiences can have on teachers’ instructional approaches and student engagement in science.

*Funder:* NCI YES R25

**We Are Our Medicine**

*Authors:* Regina Idoate, University of Nebraska Medical Center; Maurice Godfrey, University of Nebraska Medical Center; Joyce Solheim, University of Nebraska Medical Center; Aislinn Rookwood, University of Nebraska Medical Center; Mark Gilbert, University of Nebraska Omaha, Rachel Mindrup, Creighton University, Steve Tamayo, Bluebird Cultural Initiative, Brigitte McQueen, The Union for Contemporary Art

The University of Nebraska Medical Center-Youth Enjoy Science (UNMC-YES) program participated in a community-academic medical arts partnership in Omaha, Nebraska, to increase community readiness to address cancer among historically marginalized and excluded groups in the community. Together, we conducted qualitative inquiry to explore Native American community perceptions of cancer susceptibility and perceived benefits of treatment and developed an art exhibition, WE ARE OUR MEDICINE, showcasing works of art that reflect Native American collective efficacy to address cancer. Over 75 people attended the opening event, including UNMC-YES research mentors, student and teacher participants and community members. Over 40 UNMC-YES student and teacher participants, including Native Indigenous Centered Education (NICE) program school-based Science Technology Engineering Arts Mathematics (STEAM) club participants, visited the exhibition and participated in the research design and analysis process. We will share how community-based art exhibitions can serve as opportunities for not only cancer outreach and engagement but also cancer education and cancer research experiences.

*Funder:* NCI YES R25

**HSTA TEAMS for Community Health: Teaching Educators and Adolescents Mentoring and Science (TEAMS) to Improve Community Health**

*Authors:* Cathy Morton, West Virginia University HSTA; Summer Kuhn, West Virginia University HSTA

The Health Sciences and Technology Academy (HSTA) of the West Virginia University (WVU) Robert C. Byrd Health Sciences Center submits this proposal with the novel approach of using a team-based mentoring structure to facilitate the development and execution of Community Based Participatory Research (CBPR) and Citizen Science (CI) projects across West Virginia. HSTA leverages its unique network of resources as an established college-prep program focused on the Science, Technology, Engineering, and Mathematics (STEM) fields plus Medicine (STEM+M) that serves students underserved and underrepresented across West Virginia’s education and health care institutions. The aims of this proposal are: 1) To create an immersive on-campus summer experience for teachers, mentors, and students that will a) increase knowledge of STEM+M and b) set the foundation for critical inquiry and independent research supported by a team of university faculty, staff, and near-peer mentors, while c) providing opportunities for students from underserved communities in West Virginia (WV) to be exposed to degrees and careers in STEM+M fields; 2) To provide teachers with professional development in science content and mentoring students into research to support the delivery of the HSTA after-school club curriculum and the development and execution of student-initiated research projects to be supported by teacher, mentor, and faculty teams; and 3) to disseminate student research findings through local, regional, state, and national research symposia and conferences to extend the reach of HSTA students’ annual research projects into their communities and beyond. Student research will involve a pre/post measure of interest and knowledge of STEM+M among middle school students. HSTA students will deliver four hands on activities to increase STEM+M interest and awareness of STEM+M degrees and careers.

*Funder:* SEPA

**Rural secondary students produce publication-quality research results on locally endangered orchids**

*Presenters & Authors:* Jesse Mast, NH Academy of Science, jesse.mast@nhacadsci.org; Alyson Michael, NH Academy of Science, alyson.michael@nhacadsci.org

SEPA funding has provided for dozens of students to perform meaningful, publication-quality research in the NH Academy of Science’s STEM Center. Five students went to the World Orchid Conference in Taiwan in Feb 2024, and 11 students are authors on a paper in the submission process.

*Funder:* SEPA

**An Overview of a Wraparound STEAM Program in an Arkansas Delta Rural Community**

*Authors:* Marcia A. Shobe, University of Arkansas; Yvette Murphy-Erby, University of Arkansas; Michael Daugherty, University of Arkansas; Leah Cheek; University of Arkansas

The STEAM Summer Program at the University of Arkansas (UA) addresses the

underrepresentation of minorities in STEAM fields, focusing on African American

students from low-income, rural backgrounds in the Arkansas Delta. The program's

primary aim is to enhance STEAM awareness and academic success among 400 rising

6th graders, preparing them for high school and college STEAM disciplines. The

program's three main objectives are: 1. Improve STEAM awareness and educational

outcomes for students. This involves project-based learning activities, peer-mentorship,

and faculty counseling at UA, including seminars on college preparedness and life skills.

2. Enhance teaching performance and methods for 15 STEAM teachers through

curriculum training and practical teaching experience, focusing on integrated, projectbased

learning. 3. Support college savings for participants through a Child Savings

Account (CSA) Program, providing seed money and financial education for students and

families. Short-term goals include raising STEAM awareness, readiness, and academic

efficacy among underrepresented minority students, improving STEAM teaching

efficacy, initiating college savings, and contributing to public health improvement. Longterm

aims focus on high school achievement, better STEAM education in schools,

increased college enrollment and graduation, community economic and health

advancement, and establishing career paths in STEAM fields.

*Funder:* SEPA

**Science Teaching & Learning, set 2 of 2: Wednesday, 4:00 – 4:55 pm**

**Room: Wasatch**

**Facilitating sustainable partnerships for STEM education and accessible pathways for STEM students using an evidence-based model**

*Authors:* Debra Yourick; Kathleen Umayam; Emonie Hall; Swati Ramadorai; Laura Tenenbaum; Adaeze Egwuatu

Our in-school enrichment program partners HBCUs and their undergraduate STEM majors, trained as near-peer mentors (NPMs), with high school biology classrooms at local public high schools. NPMs implement NGSS-aligned, hands-on activities in their partnered high school(s) during the school year with the goal of improving science attitudes, interest, and engagement within underserved and underrepresented communities. The program is completing the third year of implementation and data analysis for year three will be conducted during summer 2024. Quantitative outcomes from year one demonstrated that participants reported significantly higher positive science attitudes in relation to matched comparison following the completion of the program, however, year two outcomes demonstrated no significant difference, likely due to significantly reduced contact hours. Qualitative findings included positive feedback from student and teacher participants. Specifically, students built a strong rapport with their NPMs, learned better with NPM guidance, loved learning with the enrichment program, and wanted increased program frequency and duration. Teachers cited increased classroom support, novel opportunities for students, and the unique perspective of NPMs. The ultimate goal of our project is to foster longer term partnerships between these HBCUs and their local secondary schools. Challenges, successes, and future directions will also be discussed.

*Funder:* SEPA

**Engaging One-Health Role-Models to Increase STEM Competency and Motivation in Middle School Students**

*Authors:* Julie Harlin, Texas A&M University; Torri Whitaker

This five–year project is part of a NIH-SEPA funded grant (https://nihsepa.org) which has developed student-centered online modules designed to teach science standards in the context of One-Health (the integration of human, animal, and environmental health). Each module also incorporates case studies focused on real-world issues designed to be of increased interest to students. This project addresses student motivation as well as science competency by incorporating relevant problem-based learning facilitated by near-peer role models who introduce middle school students to science and the scientific community.

*Funder:* SEPA

**Creating Resources Uplifting Nutrition, Culture, & Health at Lunch (CRUNCH Lunch)**

*Author:* Pamela Koch Koch, Teachers College, Columbia University

Creating Resources Uplifting Nutrition, Culture and Health at Lunch, CRUNCH Lunch, uses robust, engaging, and comprehensive teacher professional development to make the connection between STEM and school lunch happen. We have learned in our prior work that enabling teachers to deliver culturally relevant science curriculum tying STEM to student’s experiences around their neighborhood food environment can spark interest in STEM and increase food literacy by promoting health self-efficacy, health literacy, and healthier eating behaviors. The current environment of adopting Universal Free Meals throughout the U.S. offers an unprecedented opportunity to improve attitudes and confidence in STEM and connect education to school lunch for up to 30 million public school children.

*Funder:* SEPA

**Successes and challenges of XULA-MOLE’s teachers professional development workshop.**

*Authors:* Mehnaaz Ali, Xavier University of Louisiana; Abha Verma, Xavier University of Louisiana;

The current study describes on going work from the Xavier University of Louisiana Mobile Outreach for Laboratory Enrichment (XULA-MOLE) project which is a collaboration between Xavier University of Louisiana (XULA), a historically black and catholic university, and participating 9th-12th grade classrooms in the central New Orleans area with a historically underserved student population.

This work focuses on sharing our challenges and successes with providing a teachers professional development workshop facilitated by the XULA-MOLE project. The summer workshop is designed to provide training on pedagogical topics, an interactive teachers near-peer mentoring session, and experimental training for classroom laboratory experiments. We will discuss strategies to increase teacher enrollment, pedagogical topics that had the most impact and continuing challenges with providing a sustainable teacher mentoring network.

*Funder:* SEPA

**Teacher Professional Development, set 2 of 3: Wednesday, 4:00 – 4:55 pm**

**Room: Sawtooth**

**Teachers and Students for Community Oriented Research and Education Linking Industry Partners, Faculty, and Teachers (TSCORE-LIFT)**

*Authors:* Maria Alonso Luaces, PhD, Office of Diversity and Inclusion, Department of Family and Community Medicine, University of Kansas Medical Center; Maya Baughn, BHS, Department of Family and Community Medicine, University of Kansas Medical Center; Karin Chang, PhD, Urban Education Research Center, University of Missouri Kansas City; Megha Ramaswamy, PhD, MPH, Department of Health Systems and Population Health, University of Washington.

T-SCORE LIFT works with five under-resourced school districts in Kansas (4 urban and 1 rural) to develop robust CTE health science pathways. Key to success is the formation and maintenance of effective industry partnerships; nevertheless, those connections are more likely to form in well-resourced districts, potentially deepening existing inequalities between schools. This project engages health system, university, and school district partners to work collaboratively to bring cognitive and material resources to increase rigor and relevance in the curriculum. Our multipronged intervention approach includes 1) school-based and off-site engagements with professionals, 2) teacher professional development with a focus on storylines, workforce trends, and professional industry connections, and 3) securing work-based experience for students attending underserved schools within opportunity-hoarding environments. To date, approximately 600 students and 11 teachers have participated in the project, MOUs have been signed with participating districts and partnership connections for TSCORE LIFT teachers have almost doubled. Survey and academic data from participating students and teachers have been collected to assess the project's impact.

*Funder:* SEPA

**A STEM professional development program for teachers within the context of asthma: successes, challenges, and opportunities.**

*Authors:* Orestes Quesada, University of Puerto Rico- Río Piedras; Michelle Borrero, University of Puerto Rico- Río Piedras; Edjean Calderón, CoopSEI; John Ramirez, CoopSEI

The UPR SEPA: Asthma Awareness Program offers a two-year professional development program for STEM secondary teachers from public and private schools in the north-east region of Puerto Rico. Thus far, two cohorts of teachers (n = 30) have benefited from SEPA’s professional development (PD) program. Invited schools can select two to three teachers to participate in the program. PD activities target the development of knowledge and competencies in asthma identification and management, STEM education, and research skills. We measured the program’s impact on teachers’ knowledge and practice through self-administered questionnaires that gather quantitative and qualitative information. Preliminary results suggest that SEPA’s PD program is statistically effective in increasing teachers' knowledge of health and asthma issues and robotics (p<0.05). Likewise, 91% of participants indicated acquiring new scientific knowledge. We have evidence of teachers’ classroom transfer as they develop asthma awareness activities with their students. However, consistent teacher attendance and the development and implementation of classroom projects has been challenging. As we prepare to recruit a new group of teachers, we are committed to enhancing their participation and dedication to the program. We will carefully consider teachers' feedback and suggestions, striving to create a more engaging and supportive environment for all participants.

*Funder:* SEPA

**Phenomenal Genome - bringing complex genetics to classrooms and museums**

*Authors:* Hilleary Osheroff, Exploratorium; Kristina Yu, Exploratorium

With the Phenomenal Genome project, we have developed classroom activities for middle and high school teachers to incorporate the perspectives of modern genomics into their inheritance and variation curricula. We will share activities and findings to date, on teacher learning and shifting teacher practices. In addition, we have prototyped exhibits for museum visitors that emphasize the role of environment and probability in addition to genetics to modernize the museum's presentation of genetics.

*Funder:* SEPA

**Teaching the Genome Generation**

*Authors:* Erica Gerace, The Jackson Laboratory; Christina Vallianatos, The Jackson Laboratory; Alexa Wnorowski, The Jackson Laboratory; Sarah Wojiski, The Jackson Laboratory; Charlie Wray, The Jackson Laboratory

Teaching the Genome Generation (TtGG) provides pre-service and current high school teachers with the content knowledge, teaching strategies, and resources needed to enhance student learning in genetics and genomics, with an emphasis on math skills and data literacy. Our approach weaves together three learning strands—molecular genetics, bioinformatics, and bioethics—within the context of Next Generation Science Standards (NGSS).

*Funder:* SEPA

**Poster Roundtables Session 3: Thursday, May 31, 11:00-11:45am**

**Broadening Participation, set 3 of 3: Thursday, 11:00 – 11:45 am**

**Room: Wasatch**

**The START Program: Building a Diverse STEM Pipeline Through Authentic Research and Mentorship**

*Authors:* Luke H. Bradley, University of Kentucky; Molly McAndrew Tuck, University of Kentucky, Julie A. Bradley, University of Kentucky; Anthony Sinai, University of Kentucky, Margaret Mohr-Schroeder, University of Kentucky

The STEM Through Authentic Research and Training (START) program integrates academic, social, and professional experiences to create a sustainable STEM pipeline for underrepresented high school students. By offering year-round research opportunities (e.g., exomedicine) and professional development, the program has engaged over 2,000 students ("START Ambassadors") through virtual and in-person demonstrations, including Higher Orbits provided at-home learning kits and "Go for Launch" events to promote teamwork and communication skills, the past four years. START Apprentices received mentored research experiences and served as mentors for middle and elementary school students, while START Teachers participated in professional development. Trained near-peer mentors offer college guidance and support, fostering a sense of belonging among students. This comprehensive approach demonstrates the effectiveness of collaboration, across the University of Kentucky campus and the community, to minimize barriers to promote STEM engagement for underrepresented students.

*Funder:* SEPA

**Professional portfolio mentoring enhances biomedical workforce training and longitudinal research across NIH training initiatives**

*Authors:* Shanthia N. Espinosa, Oregon Health & Science University; Stephanie Paris, Oregon Health & Science University; Aaron Raz Link, Oregon Health & Science University Alex Vazquez-Cortes, Portland State University and Oregon Health and Science University; Connie Tran, Portland State University and Oregon Health and Science University; Sipelii, Motutama, Oregon Health & Science University Dierdre McKay, Eastern Oregon University and Oregon Health and Science University; Amanda Braley, Oregon Health & Science University; Lisa K. Marriott, Oregon Health & Science University

This poster summarizes professional portfolio outcomes from an administrative supplement to an existing SEPA (STEM Assessment and Reporting Tracker; 3R25GM129840-05S1). This supplement mentored trainees to develop a Trainee Writing Core, a Data Management Core, and a Trainee Advisory Board who guide biomedical workforce development research (OHSU IRB #22889). Supplement activities expanded professional portfolio research used to measure longitudinal outcomes associated with students’ STEM development across nationwide training programs. This supplement worked with partners across NIH training initiatives (e.g., SEPA, NCI YES, BUILD) to collaboratively curate resources for developing professional portfolios (e.g., CVs, ORCID, professional email addresses, biosketches, etc.). Partners informed approaches for teaching professional portfolios to trainees (e.g., using peer-led, group engagement, facilitated peer review, online formats, etc.). Strong results across settings warrant the inclusion of professional portfolio development in biomedical training programs. Portfolios provide an applied lens for trainees to see themselves as scientists, which can be used to apply for future opportunities (e.g., scholarships, internships). Simultaneously, portfolios document channels for locating alumni and engaging them in research needed to understand the long-term impacts of NIH-funded biomedical training.

*Funder:* SEPA, Supplement from last SEPA; bridges YES and BUILD

**Bringing Data Science to Underrepresented Boston Youth: the LEAH Knox Scholars Program**

*Authors:* Paul Gregg; Daisy Ortega; Martine Francois, et al.

The LEAH Knox Scholars program (LKS) is a two-year program for Boston-area high schoolers underrepresented in the sciences (low-income, first-gen college, and/or youth of color). It consists of two paid summer data science internships, college access and persistence programming, professional mentorship, and social-emotional learning programming. The program is implemented by Health Resources in Action, the nonprofit public health organization where the LKS project is seated, and Massachusetts Institute of Technology (MIT). The project just completed its pilot year in a new 5-year SEPA grant focusing on data science. This poster will discuss successes and challenges from the pilot year and learnings for the remainder of the grant. In particular, the poster will focus on our efforts to dial in the appropriate intensity of data science training given the populations and structures the program works with.

*Funder:* SEPA

**ASSET, Engaging Students in Hands-on Science Using Protozoa**

*Authors:* Douglas Chalker, Washington University in St. Louis; Kati Prince, Washington University in St. Louis; Donna-Cassidy Hanley, Cornell University; Theodore Clark, Cornell University

ASSET (Advancing Secondary Science Education through Tetrahymena) provides innovative, hands-on K-12 science curricula and classroom resources (at no cost to teachers) that facilitate student inquiry and understanding of key unifying concepts and processes underlying modern biology. Using a single-celled protozoa (Tetrahymena) as a teaching tool, our easy to implement lessons enable science teachers to increase their own impact on potential future scientists by engaging them in well-designed, safe experiments involving living organisms within the framework of classroom activities. ASSET provides stimulating learning tools for students of all grade levels, and has specifically targeted the needs of teachers that lack significant resources, but are nonetheless tasked with engaging young students in science at a critical time in their learning. Recently, we have developed new modules that are centered around the 5E pedagogical approach, a model of learning that includes five stages: engage, explore, explain, extend, and evaluate. Students exhibited noticeable engagement in the activities, and the updated format provided an opportunity for them to actively share their thoughts. Our most popular modules allow students to see the effects of smoking, vaping, or drinking alcohol on live cells using lessons that can be implemented in either science or health curricula.

*Funder:* SEPA

**Curriculum Development, set 2 of 2: Thursday, 11:00 – 11:45 am**

**Room: Tucson**

**Working with Community Partners to Sustain a Program After Funding Ends: Challenges and Successes**

*Authors:* Irene S. Bayer, Michigan State University; Maria G. Salinas, Michigan State University; Tania Jarosowich, Censeo Group, Consuelo J. Morales, Michigan State University

Health in Our Hands (HiOH) connects the science classroom to the community to give youth and adults an understanding of modern concepts in genetics. Using project-based learning, students investigate public health concerns and use these real-world contexts to appreciate the importance of both genetic and environmental factors in their risk for diseases. The units culminate in a final project. Students conduct an action research project to improve their school or neighborhood to help prevent disease and present the results and recommendations at a Youth Health Summit to their community.

Partners from school districts, health-related organizations, and community-based organizations have been involved in every phase of the project including curriculum design, classroom activities, community action projects, health summit planning, analysis and dissemination of results. In 2018, we formed a collaborative, the HiOH-Flint/Genesee Partnership, and embarked on a planning process to explore how to sustain this novel design for education in our schools and community and share lessons learned for other communities. This session will discuss development of a sustainability handbook, successes and challenges in this process, and next steps.

*Funder:* SEPA

**Empowering Youth as Vaccine Champions: A Pharmacy-Led Curriculum to Address COVID-19 Vaccine Hesitancy**

*Authors:* Yen Dang, University of Maryland Eastern Shore; Anjan Nan, University of Maryland Eastern Shore

In response to Somerset County's high COVID-19 positivity rates and low vaccination rates, a pharmacy-led curriculum was developed to address COVID-19 vaccine hesitancy among underrepresented high school students. The program, based on WHO SAGE Vaccine Hesitancy Matrix, included interactive modules and discussions from key leaders in the community to improve vaccine trust. Students visited a vaccine clinic at a local pharmacy and created two videos educating their peers to become vaccinated against COVID-19. Preliminary results from 45 participants showed significant increases in knowledge about COVID-19 and its vaccine. Most students found the program well-organized and expressed willingness to promote vaccination in their community. This innovative initiative empowered students to become vaccine champions, bridging educational gaps and fostering community engagement in vaccination efforts.

*Funder:* SEPA

**The ABC Project: Dive into one lesson that integrates bioinformatics into high school biology**

*Authors:* Jessica Siltberg-Liberles, Florida International University; Janelle Nunez-Castilla, Florida International University; Laird Kramer, Florida International University; Rocio Benabentos, Florida International University; Shaileen Barberena, Florida International University

The Authentic Bioinformatics in the Classroom (ABC) Project integrates bioinformatics into high school biology classes through a coordinated set of lessons and research modules. The goal is to promote mastery of biological sciences while stimulating interest and awareness of bioinformatics among high school students, especially those from historically underrepresented groups. Furthermore, the research modules incorporate human disease as a central theme to underscore the societal relevance of biomedical research and intentionally provide a mechanism for students to imagine themselves as future scientists. The project is carried out through a long-standing partnership across Florida International University (FIU) and Miami-Dade County Public Schools, engaging both biology teachers and district administrators. The presentation delves into one of the ABC lessons that focuses on the relationship between amino acid properties, protein structure, and protein function to illustrate the project’s strategic approach to developing biology understanding through use of bioinformatics tools. The curriculum and pedagogy will be provided, as well as assessment strategies. Insights from teacher implementers and undergraduate bioinformatics ambassadors, as well as the overarching instructional context, will be shared. Plans for the upcoming randomized trial will also be summarized.

*Funder:* SEPA

**Engineering Solutions for Better Health: Genetic Technology & Biomedical Engineering for Secondary Classrooms**

*Authors:* Louisa A. Stark & the Genetic Science Learning Center team, University of Utah

We are developing two NGSS-aligned curriculum supplement modules that focus on new and emerging technologies. The recently completed [*Genetic Tech Investigations*](https://teach.genetics.utah.edu/content/gentech/) module for high school (grades 9-10) highlights several technologies researchers use to explore molecular processes and understand genetic disorders—DNA sequencing, flow cytometry, mass spectrometry, and live cell imaging. The materials support students in recognizing that genetic technologies employ biochemical processes. They then build understanding that genetic technologies can be used to identify places at any level—DNA, mRNA, protein or protein function—where information transfer has gone wrong. Finally, students use data from genetic technologies to draw conclusions about what may be happening to identify genetic disorders and predict health consequences. A biomedical engineering module for middle school (grades 7-8) that is in development focuses on engineering design applications that connect to the organ and sensory system units taught at that level. We are using a 3-step, backwards design process to develop and validate assessment instruments that will be used to study the efficacy of each module for student learning.

A key component of both modules are curriculum-embedded videos that are designed to introduce students to STEM careers. For the high school module we produced and are studying the impact on students’ science identity and self-efficacy of three video versions: (1) lab tour at ARUP Laboratories with a focus on the equipment, (2) interview with a lab supervisor of Pacific Island heritage who had a winding career path to his current position, and (3) a Latina teen’s visit to the laboratory and her experiences. We are working with a prosthetic arm bioengineering lab to produce videos for the middle school module.

*Funder:* SEPA

**STEM Under the BIG Top**

*Authors:* Amanda Obery, Central Washington University; Matt Queen, Montana State University Billings

Authentic Community Engagement in Sciences (ACES) project builds knowledge and interest in biomedical and STEM careers throughout Eastern Montana including rural and tribal communities. ACES works with these communities to create an experience for upper elementary students to see how important STEM and biomedical fields are to their daily lives. With teachers and local professionals, ACES supports the development of a culturally relevant curriculum centering local phenomena and careers. The curriculum prepares students for the Atomic Circus Show, a multimedia biochemical spectacular, complete with a rock band and interpretative dancers that is tailored to each town. The ACES Project, now in its 3rd year has taken the show on the road and it is working with its 4th community across Eastern Montana!

*Funder:* SEPA

**Mystery of the Crooked Cell 2.0: CityLab’s Next Generation Socioscientific Approach to Gene Editing**

*Authors:* Don DeRosa, Boston University; Carla Romney, Boston University; Carl Franzblau, Boston University; Stuart Beard, Boston University

Boston University developed the original Mystery of the Crooked Cell (MCC), a hands-on laboratory-based curriculum supplement that explores the molecular basis of sickle cell disease (SCD) in 1992. MCC has been expanded over the past 30 years and is aligned to NGSS and Massachusetts curriculum frameworks. We are now developing MCC 2.0 to use the platform of SCD and its treatment as a means to encourage students to:

* explore the genetic basis of the disease and cutting-edge treatments based on gene editing techniques
* understand the bioethical considerations that apply to these advances in science/health
* develop broadly applicable socioscientific reasoning skills
* promote stronger science identities and persistence in STEM/biomedical sciences through personally-relevant science content and contexts.

This poster will describe our progress to date and invite viewers to share their insights and experiences with these practices.

*Funder:* SEPA

**Informal Science Education, set 3 of 3: Thursday, 11:00 – 11:45 am**

**Room: Sun Valley**

**Building the Pipeline of Rural Underrepresented Students in Nursing Science-The HSTA-Alabama Program**

*Authors:* Robin Bartlett, University of Alabama, Michele Montgomery, University of Alabama, Bethany Hornbeck, APIS

Building the Pipeline of Rural Underrepresented Students in Nursing Science-The HSTA-Alabama Program: Purpose: The ongoing nursing shortage is predicted to continue through 2030. Notably, the number of registered nurses (RNs) dropped by 100,000 from 2020 to 2021. For many years the number of underrepresented RNs has always been disproportionate to the population of the United States (US). Nurses, nurse faculty and nurse scientist from minority and rural communities are in demand. As the most trusted healthcare professionals, nurses should equally represent their patients. These nurses will understand the life experiences, family dynamics, cultural contexts, and community resources of those with similar backgrounds. They can assist in navigating the healthcare industry to improve health outcomes. Health equity is achieved by diversity among caregivers, nurse educators and research teams that understand and address multifaceted problems. The purpose of HSTA-AL, which stands for Health Science, Technology Academy of Alabama, a program duplicated from a successful West Virginia STEM program, is to examine the outcomes of a theory-driven mentoring program.

Methods: HSTA-AL recruits’ students from rural Alabama and enrolls them in a program that promotes citizen science and community led research teams, summer camp immersion experiences, and a club model experience in their local schools. Students receive surveys to determine outcomes of the HSTA program on academic success, intellectual risk taking, self confidence and academic intentions.

Results: This is an ongoing program that will follow students through graduation. Twenty-four students completed both pre- and post-surveys. Seventy percent identified as African American, and all were from rural communities. The majority (80%) were female, and less than half of their parents completed college. Significant differences were noted in community engagement and other measures between baseline and year 1. These results will be compiled and reported.

Conclusion: HSTA-AL is theorized to increase the number of unrepresented students interested in research and teaching in the nursing profession through active, ongoing engagement and the introduction to nursing research. Because of the need to increase diversity in nurses who serve rural areas, programs like HSTA-AL must be tested and refined to determine the best strategies for student success.

*Funder:* SEPA

**Eradicating Misconceptions about Viruses using Multimodal Trace Data in an Intelligent Game-based Environment across Educational Contexts**

*Authors:* Barrie Robison, University of Idaho; Terence Soule, University of Idaho; Roger Azevedo, University of Central Florida

We have developed Outbreak Simulator, an engaging, innovative, game-based simulation of infectious disease spread across the U.S. Outbreak Simulator was designed to achieve four major goals: (1) Educate users about infectious diseases, including key factors impacting spread and severity of outbreaks, and standard models of the spread of infectious diseases. (2) Inspire people from diverse backgrounds to consider careers in biomedical research. (3) Provide teachers with engaging tools to build students’ systems thinking and data science skills. (4) Conduct innovative STEM education research on remediating misconceptions using systems thinking and advanced learning technologies. Outbreak Simulator includes specific scenarios that help users to understand and explore the factors contributing to the spread of infectious diseases and opened-ended experiment modes where users can experiment with a wide range of diseases parameters. Outbreak Simulator can be downloaded from our website <https://polymorphiced.uidaho.edu/>.

*Funder:* SEPA

**Adapting and Scaling the Biotinkering Approach through a Community of Practice (CoP) Model**

*Authors:* Prinda Wanakule, The Tech Interactive; Anja Scholze, Scholze Consulting; Monika Mayer, Monika Mayer Consulting; Mindy Porter, Scott Family Amazeum; Dana Schloss, New York Hall of Science; Holly Truitt, Holly Truitt Consulting; Caitlin Nealon, The Tech Interactive

We have previously developed a novel approach to informal biology education, the Biotinkering Approach, which provides experiences that allow people of all ages to use biology as a creative and problem-solving medium through open-ended exploration and design. Our current project aims to spread this approach within the field by establishing a Biotinkering Community of Practice (CoP) to develop a thriving community of biotinkering practitioners who are engaged in community-centered, culturally-relevant practices. To do this, we have developed partnerships with other informal science education sites, including the Scott Family Amazeum, New York Hall of Science, and SciDesigns Communications. Each site will work with a community partner to co-design new biotinkering experiences for a wide range of audiences and informal educational structures. We will provide insights from the first year of our project, including front-end evaluation findings and learnings from the establishment of the CoP.

*Funder:* SEPA

**The Appalachian Career Training In ONcology (ACTION) Program: An NCI-Funded Youth Enjoy Science Program**

*Authors:* Nathan L. Vanderford, University of Kentucky; Holly Burke, University of Kentucky

Kentucky has the highest cancer incidence and mortality rates in the US with the highest burden of the disease being localized to the Appalachian region of the state. Residents of Appalachian Kentucky also experience high rates of poverty, low education attainment as well as other disparities. Through funding from the National Cancer Institute’s Youth Enjoy Science R25 program, the Appalachian Career Training In ONcology (ACTION) Program at the University of Kentucky Markey Cancer Center provides enhanced cancer-focused training for high school and undergraduate students from rural Appalachian Kentucky and works to develop a better understanding of cancer in the community through community outreach and engagement activities. The overarching goal of the program is to enhance the diversity of the biomedical workforce by preparing Appalachian Kentucky students for biomedical careers, increase the community’s understanding of cancer, and thereby address the cancer and education disparities in Appalachian Kentucky and beyond.

*Funder:* NCI YES R25

**Wildfire and Human Health in a Changing Climate**

*Authors:* Victoria Coats, OMSI; Cecilia Nguyen, OMSI; Scott Randol, OMSI; Nelda Reyes, AB Cultural Drivers

The Oregon Museum of Science and Industry (OMSI), in collaboration with partners at Oregon MESA (MESA), Oregon Health & Science University (OHSU), the World Forestry Center (WFC), and AB Cultural Driver (ABCD), is leading Wildfire and Human Health in a Changing Climate, a five-year Science Education Partnership Award (SEPA) project from the National Institutes of Health (NIH). The project will foster better public understanding of the health impacts of large and severe wildfires, the complexities of their causes, and strategies for mitigation and adaptation. Project deliverables include: a bilingual (Spanish/English) nationally traveling exhibition, project website, and educators’ guide. Our poster will share Year 1 findings from front-end studies with OMSI visitors and MESA students and families.

*Funder:* SEPA

**Environmental Health Investigators: Developing STEM & health appreciation and career awareness with a diverse group of middle school students**

*Authors:* Andreia F. Dexheimer, Southern Illinois University Edwardsville; Charlie Blake, Southern Illinois University Edwardsville; Amanda Jane, Southern Illinois University Edwardsville; Mariam Sani, Southern Illinois University Edwardsville; Pratigyan Bhusal, Southern Illinois University Edwardsville; Ozaveshe Paul Amune, Southern Illinois University Edwardsville; Carol E. Colaninno, Emory University; Candice L. Johnson, Southern Illinois University Edwardsville; Jennifer L. Zuercher, Southern Illinois University Edwardsville; Ben K. Greenfield, University of Southern Maine; Georgia Bracey, Southern Illinois University Edwardsville; Sharon M. Locke, Southern Illinois University Edwardsville.

We designed and developed the Environmental Health Investigator (EHI) program to promote STEM and health appreciation and career awareness among a diverse group of middle school students. We combined high-impact educational practices and applied environmental education methodologies, using student choice and community relevance as central tenets for curriculum design and programming. We interviewed and surveyed 30 middle school students before and after our summer research academy to answer the question: to what extent does participation in a summer research academy centered on environmental health increase science appreciation and awareness of and intent to pursue a career in STEM and health fields? We found that students grew in their science appreciation (V = 72, p < 0.005) and STEM/health career awareness (V=83.5, p=0.001), and science appreciation played a role in STEM/health career choice (F = 12.07, p = 0.001). The EHI summer research academy shows how environmental monitoring sensors offer an opportunity for students to engage in environmental health monitoring activities and has the potential to broaden participation in STEM and health fields.

*Funder:* SEPA

**Interactive Multimedia, set 1 of 1: Thursday, 11:00 – 11:45 am**

**Room: Flagstaff**

**Enhancing Educational Multimedia: Insights from Successful Videos, Games, and Apps**

*Authors:* John A. Pollock, Duquesne University; Brinley Kantorski, Duquesne University; Kelly Bruzdewicz, Duquesne University

The Partnership in Education produces educational multimedia, with a focus on animated YouTube videos, board games, and apps. Quality curriculum pieces are also produced to complement our products, facilitating their use in the K-12 classroom. Here, we illustrate successful implementation and the impact on student knowledge, attitudes, and opinions. Furthermore, we leverage educational design principles to establish a framework for educational game development. We offer practical insights for designers and developers to enhance multimedia effectiveness in learning environments. Our work expands multimedia-based education, aiming to inform pedagogical practices and foster deeper understanding of multimedia's role in education.

*Funder:* SEPA

**Adventures in Drug Discovery: Integrating Data Science into the Science Curriculum**

*Authors:* Charles Xie, Dylan Bulseco, Institute for Future Intelligence; Kent J. Crippen, University of Florida

This poster will demonstrate Artificial Intelligence for Molecular Science (AIMS), an integrated Web-based software platform based on using visual and interactive technologies to support the learning and teaching of the science, data, and computation needed to find or design new small-molecule drugs. The goal of AIMS is to foster the integration of data science into the science curriculum in secondary schools.

*Funder:* SEPA

**High School Students Positively Engage With and Rate Augmented Reality Educational Activities**

*Authors:* Heather Ryan, 3D Molecular Designs; Mark Holezer, 3D Molecular Designs

Over 1,000 high school students in 60 classrooms across the country field-tested an augmented reality smartphone app in their first-year biology classes in the fall of 2023. In this unmoderated study, students generally used their own smartphones paired with physical models from 3D Molecular Designs. The students completed 1 – 4 “training” activities designed to test the functionality and usability of the application. Educators reported that their students were engaged, focused, energetic, and excited. After each activity, students completed a survey about their experience and the app function. Students rated the application and the activities on a Likert scale all means were on the positive half of the scale. Surveys also collected information on the environment and smartphones that can be used for future project planning.

*Funder:* Interactive Digital Media STEM SBIR/STTR

**Natural Disasters & Health**

*Authors:* *Charles Wood, Debbie Tyrrell, Manetta Calinger, Jackie Shia, Lori Kudlack, Laura Ondeck; Wheeling University*

Natural Disasters and Health is a live online simulation that links the drama and emergency of hurricanes, tornadoes, floods, eruptions and earthquakes with student role-playing as specialists in triage, ER and disaster assessment to provide middle school students authentic-like experiences in diagnosing and treating associated injuries and illnesses. Our observations as students conducted missions for evaluation showed widespread immersion in the simulation as students quickly worked to triage patients at the disaster sites, decided which patients were most seriously affected and required helicopter versus ambulance transport to hospitals, and examined patients and ordered appropriate medical tests to decide on optimum hospital treatment. Periodically, students received alerts about changing disaster conditions and warnings of health effects due to down electrical wires, collapsing buildings and high winds and waters, and they wrote short public health announcements summarizing dangers, safety actions, and injury incidents. Students were obviously entranced and engaged in their tasks; ongoing analysis of evaluation surveys will document levels of learning and possible changes in attitudes.

*Funder:* SEPA

**Gamifying epigenetic science for teaching environmental health literacy**

*Authors:* James Stafford, Nzumbe Inc.; Lisa K. Marriott, Oregon Health & Science University; Stephanie E. Paris, Oregon Health & Science University; Diana Rohlman, Oregon State University; Mitchell Turker, Nzumbe Inc.; Abinaya Ravishankar, Nzumbe Inc.; and Michael Rountree, Nzumbe Inc.

Toxic environments are linked directly to human health and disease, therefore a critical need exists to educate the US population about environmental health. This project (1R43ES031414-01) is a collaboration to improve environmental health literacy of students to understand how the environment and experiences can influence human health, essential for informed choices and better public health. To gamify learning around environmental health literacy, the team designed learning modules, a hands-on laboratory kit, and an interactive mobile game (EpiMonTM). Now in its beta version, the EpiMonTM integrated platform and user interface actively involve students in learning environmental health in engaging ways that crystallize core concepts of how our decisions, exposure to chemicals, and general environmental exposures impact human health. This project developed accessible learning modules that span contemporary environmental health literacy topics including ionizing radiation, chemical exposure, and climate change, integrating considerations associated with health equity and social determinants of health. The modular approach allows educators to customize the epigenetics learning experience and measure impact with their students.

*Funder:* National Institute of Environmental Health Science (NIEHS)

**Research Experiences for Students & Teachers, set 3 of 3: Thursday, 11:00 – 11:45 am**

**Room: Uintah**

**A School-based Citizen Science Project to Communicate Findings from Drinking Water Tests and Improve Human Health**

*Authors:* Jane E. Disney, MDI Biological Laboratory; Brian Jackson, Dartmouth College; Ramsey Steiner, Dartmouth College; Amy Steckler, MDI Biological Laboratory; Caitlin Oliver-Olsen, MDI Biological Laboratory; Ashley Taylor, MDI Biological Laboratory; Alexis Garretson, MDI Biological Laboratory; Cait Bailey, MDI Biological Laboratory; Karen Bieluch, Dartmouth College; Bill Zoellick, consultant

Our new NIH NINR-supported SEPA program engages teachers and students from Maine and New Hampshire in collecting drinking water samples for analysis of toxic metals. We provide science communication training and tools for students, empowering them to inform their communities of findings from their studies. The project also has a focus on intergenerational learning to increase student self-efficacy in science and effect mitigation measures at the household and community level. This project builds on our previous work, which focused on data literacy and engaging students as citizen scientists in addressing the issue of arsenic contamination of well water in rural communities. Our new school-based citizen science project incorporates feedback from teachers, expressing the importance of including students with homes dependent on community and municipal public water systems, their concern about other drinking water contaminants like uranium, lead, and PFAS “forever” chemicals, and the need to improve student outreach skills. This has led to increased interest in project participation across both states. Anticipated outcomes of our new SEPA program are increased environmental health literacy and student interest in STEM, reduction in exposure to toxins in drinking water, and improved public health.

*Funder:* SEPA

**Opening WINDOWS for high school learners to see and explore dentistry and dental research careers**

*Authors:* Kirsten Lampi, Oregon Health and Science University

The Oregon Health & Science University School of Dentistry (OHSU SOD) is launching a new initiative to promote oral healthcare careers among high school learners. Most high schoolers have extremely limited knowledge of the wide diversity of career paths available in dentistry and we are seeking to not only raise this awareness, but also to provide opportunities for oral health-related research internships and clinical experiences. There is currently no program within the state of Oregon that provides such experiences, and OHSU SOD is the only Oregon institution qualified to deliver both cutting edge research and clinical care experiences to our high schoolers. Consequently, a team of OHSU SOD faculty have developed an innovative proposal to address this unmet need in the state and surrounding regions. The program, termed Walk IN Dental Oral Ways of Science (WINDOWS), builds upon our successes with recently funded undergraduate/postdoctoral research training programs, but is specifically tailored to address the oral health disparities present in rural regions of Oregon and beyond. The goal is to promote dental careers via a variety of outreach activities, in class experiences, as well as to provide research internships that will further expose learners to the field and bolster the competitiveness of our trainees as they pursue advanced education. The program will open the windows for students to see the many different possibilities for future careers in dentistry and dental research.

*Funder:* Institutional Support

**Learning and Discovery in Experimental Environmental Health Science: On the Path from Data to Knowledge**

*Authors:* David Petering, University of Wisconsin-Milwaukee; Craig Berg, University of Wisconsin-Milwaukee; Michael Carvan, University of Wisconsin-Milwaukee; Renee Hesselbach, University of Wisconsin-Milwaukee

The goal of the UW-Milwaukee SEPA program is to offer large numbers of high school students from diverse backgrounds opportunities to conduct a full range of scientific activities from research to scientific communication. We deliver the program in collaboration with in-service teachers, early career teachers emerging from our pre-service teacher emphasis, and mentor teachers. The novel underlying theme running through our program is data - the nature, acquisition, and analysis of data. Students will be able to analyze their individual and aggregated data with the lens of introductory data science and a fully developed “big” data portal. Complementing this emphasis, student experimentation is placed within a context of science and society, called environmental health civics – a history of environmental chemicals in relation to governmental regulation and chemical toxicity research. Attention is directed toward environmental justice, particularly issues which effect Milwaukee and regional youth. The SEPA poster describes each of our experiment modules, as well as various components of the program such as current science standards that drive the program, the in-depth pre-service/in- teacher training, various student learning opportunities (e.g., research activities, Student Research Conference, data portal, etc.), and program evaluation. Supported by NIH-NIGMS grant 1R25GM142031.

*Funder:* SEPA

**Frugal Science Academy**

*Author:* Janet Standeven, Georgia Institute of Tech

The Frugal Science Academy develops low-cost devices to enable synthetic biology research in low-resource areas. By encouraging High School Researchers to harness their inner curiosity, we develop both devices and future inventors. We provide teachers with professional development to disseminate the devices, enabling anyone anywhere to "do" science.

*Funder:* SEPA

**Teacher Professional Development, set 3 of 3: Thursday, 11:00 – 11:45 am**

**Room: Sawtooth**

**Seeds to STEM: Cultivating Early Nutrition, Literacy, Numeracy and STEM Skills in Teachers, 3-5 Year Olds, and Families Through an Asset-based Curriculum in Two Major Cities**

*Authors:* Jacqueline Genovesi, Academy of Natural Sciences (ANS); Kaitlyn DelDuca ANS; Mariah Romaninsky ANS

The Academy of Natural Sciences of Drexel University, GrowingGreat and the School of Education of Drexel University have developed an early nutrition, STEM and literacy program called Seeds to STEM. The mission of Seeds to STEM is to empower very young children along with their families and teachers to make healthy food choices through an inquiry-based nutrition, STEM, literacy, and garden education program. Seeds to STEM is being piloted in two U.S. cities -- Philadelphia, PA, and Los Angeles, CA -- among low-income Black and Latino families with children 3-5 years old and their teachers.

Seeds to STEM has three product deliverables:

1. An inquiry-based curriculum about early childhood nutrition and kindergarten readiness that integrates STEM, literacy, and numeracy learning through experimental activities growing food inside classrooms, urban gardens, and family homes;
2. Professional development and in-class coaching for accredited and under-accredited PreK educators including home-based care providers – because low-cost home-based childcare options are often chosen by low-income families; and
3. Programs that empower families to learn together, understand kindergarten readiness, and become more connected to health and nutrition resources in their communities.

*Funder:* SEPA

**Cultivating Interest, Expanding Expertise, Shifting PD Norms**

*Authors:* Carmela Amato-Wierda, University of New Hampshire; Amy Booth, University of New Hampshire; Alison Allen, Rockman et al.; Eleanor Jaffee, Insights Evaluation, LLC

In its third year, NH CREATES continues to enhance student and teacher understanding of regenerative medicine and biofabrication (RM&B). NH CREATES was established in 2020 to help build a skilled workforce for New Hampshire’s rapidly growing RM&B industries. The three main objectives of the initiative are to offer innovative summer youth programs for students in grades 8-12; create a professional development program for middle and high school teachers; and foster a cross-sector STEM ecosystem comprised of academic and industry partners.

Teachers who attended the NH CREATES Summer Institute have provided important reflections on their experience that are critical to the future of STEM education. They value the extra time the Institute allows them to plan, test, and design curricula and classroom projects. Teachers also find the connections made with RM&B experts to be helpful. However, it was widely agreed that participating in two weeks of intensive professional development during the summer, and refining and implementing an original classroom project during the school year, is a heavy lift. Simultaneously, the fast pace of innovation in the world of STEM demands professional development to continuously inform and train teachers about advancements in science and technology. So, how do we as outreach PIs change the systems that shape teachers’ school days so that the norm becomes continuously embedded STEM professional development?

*Funder:* SEPA

**More PEAS Please! Improves Science Knowledge, Language, and Dietary Quality among Preschoolers**

*Authors:* Virginia C. Stage, NC State University; Jocelyn B. Dixon, NC State University; Tammy D. Lee, East Carolina University; Archana V. Hegde, East Carolina University

Evaluate the effect of More PEAS Please! on Head Start preschoolers’ (3-5 years) science knowledge, language development, and dietary quality. PEAS is a multi-level teacher-led intervention designed to improve preschoolers’ early science learning experiences and exposure to healthy foods.

Study Design, Settings, Participants: Teachers implemented sixteen PEAS learning activities across five preschools (n = 19 classrooms, n = 273 children) in eastern North Carolina. Children’s dietary quality, science knowledge, and vocabulary development were measured before (T1 = Sept/Oct 2021) and after PEAS implementation (T2 = April/May 2022).

Measurable Outcome/Analysis: We used Lens on Science to measure science knowledge. We measured vocabulary using a researcher-developed vocabulary assessment tool tailored to the intervention. We measured dietary quality using a reflection spectroscopy device (Veggie MeterⓇ) that assesses skin carotenoids. Paired t-tests were used to evaluate differences between outcome variables from T1 to T2.

Results: Children were 3.94 years (SD = .70), male (51.6%), Black (82.1%), and non-Hispanic/Latino (86.4%). Both science knowledge (MT1 = .002, SDT1 = .805; MT2 = .341, SDT2 = .863; t (128) = -5.27, p < .0001) and vocabulary (MT1 = 14.2, SDT1 = 4.8; MT2 = 16.6, SDT2 = 5.3), t(117) = -4.96, p < .0001) scores were also significantly higher at post-intervention. Skin carotenoid levels were significantly higher at post-intervention (MT1 = 169.21, SDT1 = 70.77; MT2 = 188.44, SDT2 = 120.64), t(222) = -2.239, p = .026).

Conclusion: Integrating healthy foods into science learning in the preschool classroom may present a unique opportunity to improve children's science and vocabulary knowledge, while also impacting dietary quality. Additional research is needed to explore PEAS' effect on measured outcomes using a comparison group.

*Funder:* SEPA

**ESTELE: Developing the Next Generation of Science Teacher Leaders**

*Authors:* Michael Kennedy, Northwestern University; Maranda Don, Northwestern University

There is an urgent need to strengthen the quality and quantity of science instruction at the elementary grades (K-5). National data indicate, on average, elementary students receive as little as 30-45 minutes of science instruction per week – five-fold below most district standards. Further, there are few professional development programs tailored to the unique needs of generalist K-5 teachers. If the vision of the Next Generation Science Standards is to be realized, this is a critical issue to address.

Elementary Science TEacher LEaders (ESTELE), seeks to accelerate the pace at which elementary teachers can be trained and supported. Building on prior NIH/SEPA work, ESTELE uses a novel integrated approach to simultaneously train teachers new to NGSS in key pedagogical shifts while also training teachers with NGSS knowledge and experience to become science teacher leaders (STLs) at their schools. Key to this approach is an authentic “practicum” training experience in which STLs support and coach novice K-5 teachers as they learn and implement NGSS instructional practices by teaching youth in a summer STEM camp. In this way, teacher leaders gain important leadership and coaching skills, while novice teachers learn NGSS pedagogy. STLs then apply their skills during the academic year in their schools, working in support of their peer teachers to build a broader school culture receptive to NGSS reform.

*Funder:* SEPA