**SHORT TALKS ABSTRACTS**

**Wednesday, May 29**

**Concurrent Breakout Sessions #1: Wednesday, 10:15 – 11:30 am**

**Informal Science Education and**

**Research Experiences for Students & Teachers Strands**

**Room: Arizona**

**STEM+M CONNECT: A Multi-Tiered Mentoring Program that Combines the Residential Experiences of Tufts Mini-Med School**

*Authors:* Elizabeth Genne-Bacon, Tufts University School of Medicine; Revati Masilamani, Tufts University School of Medicine; Berri Jacque, Tufts University School of Medicine

Come learn about STEM+M CONNECT - A multi-tiered mentoring program that combines the residential experiences of Tufts Mini-Med School.

The overarching goal of the CONNECT program is to diversify science and medical professions by increasing sense of belonging, career awareness, and connections with people in the field. The program aims to do this by investing deeply in highly talented undergraduates and high school students from historically excluded backgrounds. The program is a collaboration between Tufts University School of Medicine’s Office for Multicultural Affairs (OMA) and the Center for Science Education (CSE). CONNECT is unique because it combines the residential experiences of Tufts Mini-Med School with a multi-tiered mentoring program. In this way, our Tufts undergraduate mentors act as role models for their high school mentees while receiving mentoring themselves from Tufts scientists. We believe this is a model that could be integrated with other similar summer programs.

Our talk will introduce the CONNECT model and we will show outcomes from the past three years. Then, we will spend time discussing our path to sustainability of the program beyond the life of the SEPA!

Strands: *Research Experiences for Students & Teachers; Broadening Participation*

**Research Experience for High School Students: Using a Cohort Model to Scaffold Scientific Content, Skills, and Confidence**

*Authors:*Cathleen Drilling, Masonic Cancer Center, University of Minnesota; Rosalind Palma Martins, Program for Health Disparities Research, University of Minnesota

One component of the R25 YES M-ASCEND (Advancing Science, Enhancing Diversity) program involves a summer internship for 10-12 high school students on the university campus. The goal is to give students from communities underrepresented in STEM an authentic research experience. Historically this has been accomplished by placing the students in professional labs and asking those teams to guide the students through the process. Two years ago, participant and mentor feedback as well as changes to the university’s Safety of Minors policy led us to reconfigure the program to a cohort model. Designed and led by an experienced high school STEM educator, the revised model scaffolded the concepts and skills throughout the research process, building up the students to independently drive their projects. After our first summer trying out this change, we observed improved comprehension and confidence in their abilities to carry out scientific research as well as strong group cohesion and enjoyment of the program. Drawbacks primarily included increased workload on program staff, but in the future we intend to hire undergraduate students to support facilitation and lab preparations while also serving as near peer mentors to the interns.

Strands: *Research Experiences for Students & Teachers; Broadening Participation*

**The Appalachian Career Training in ONcology (ACTION) Program: Students’ Perspective on Experiences and Outcomes** *(30 minutes)*

Authors: Nathan L. Vanderford, Holly Burke, and **undergraduate student participants**: Nolan Marcum, Olivia Thornsbury, Matthew Sanders

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. This session will cover student’s perspective on the program’s goals to enhance trainees’ cancer knowledge through faculty and peer mentorship, prepare students with career development opportunities and research experience, and provide opportunities to participate in substantial outreach projects. Students will share their personal experience with cancer in their Appalachian hometowns and their time in the ACTION undergraduate program at the University of Kentucky. Students will also highlight their participation in the Cancer in Appalachia Photovoice Project and most recent publication, Cancer in Appalachia: A Collection of Youth-Told Stories.

Strands: *Informal Science Education; Research Experiences for Students & Teachers*

**Writing Text for Informal Science Learning Experiences**

*Author:* Victoria Coats, Oregon Museum of Science & Industry

Writing science content for informal learning experiences can be challenging. Your audience may include learners of many different ages, abilities, and backgrounds. Free-choice learning environments are often busy, noisy places where learners are easily distracted or fatigued. This short talk will explore strategies, examples, and resources for writing more readable and engaging labels, signs, or web content for informal science exhibits, activities, or events. We will draw examples from over 20 years of SEPA-funded traveling exhibits, websites, and related projects at OMSI. Attendees will collaborate in critiquing and editing selected examples.

Strand: *Informal Science Education*

**Concurrent Breakout Sessions #1: Wednesday, 10:15 – 11:30 am**

**Research & Evaluation Strand**

**Room: Wyoming**

**Causal Analysis of the impact of the Hillman Academy on student postsecondary outcomes**

*Authors:* Alberto Guzman-Alvarez, American Institutes for Research; Danielle Lowry, University of Pittsburgh; David N. Boone, University of Pittsburgh

The Hillman Academy is an R25-YES program that aims to increase equity and broaden participation in cancer research by providing authentic research experiences and mentorship to diverse groups of high school students. Over the past 15 years, the Hillman Academy has provided 419 paid internships to 307 minoritized students. Almost all Hillman Academy alumni with known and declared majors are in STEM fields. Of the 257 minoritized Hillman Academy alumni who have graduated high school, we know that at least 253 matriculated into higher education. Of the 213 underrepresented Hillman Academy alumni we know have declared a major, 200, or ~93%, are in STEM or healthcare-related fields.

In this presentation, we will discuss the process of program leaders collaborating with causal inference researchers to evaluate the causal impact of the Hillman Academy on student postsecondary outcomes. Our study adds to the existing literature by providing causal evidence of the effectiveness of STEM bridge programs using a robust methodology. We employed a difference-in-differences approach to evaluate the program's impact, using data from applicants and program participants over the past seven years and a nationally representative student dataset. This method enabled us to isolate the effect of the internship and account for the selection bias of program applicants, providing a causal impact of the program on students' postsecondary STEM outcomes.

 Our findings contribute to the broader conversation about the role of STEM education interventions in shaping students' postsecondary outcomes. In this presentation, we will share the preliminary outcomes of our study and discuss the methodological challenges and breakthroughs, offering a roadmap for other researchers and evaluators aiming to understand the causal effects of similar programs.

Strands: *Research & Evaluation; Research Experiences for Students & Teachers*

**Impact of Career Videos on Career Aspirations, Possible Selves, and Interest in Science of High School Students**

*Authors:* Harini Krishnan, Genetic Science Learning Center, University of Utah; Rebecca Peterson, Genetic Science Learning Center, University of Utah; Rochelle Cassells, University of Utah; Arthur Veneema, Genetic Science Learning Center, University of Utah; Louisa A. Stark, Genetic Science Learning Center, University of Utah

Many science curriculum materials seek to spark students’ interest in science careers through engaging science content or hands-on activities but do not include specific references to careers that make use of that science. Other career videos show individuals talking about their career but are not tied to curriculum materials. Thus, students may be less likely to make the connection between the science and engineering content knowledge and practices that they study and a specific science or engineering career. To address this disconnect, we produced three videos and used interviews to examine how they impacted high school students’ career aspirations, possible selves and interest in science. Our findings suggest that: (a) the lab tour video generated interest in biomedical careers and provided an overview of some roles in a biomedical lab facility, (b) the interview of the lab supervisor showcased various paths to attain a career in biomedicine, and (c) the video featuring reflections of the student who conducted the interview helped students connect at a personal level with careers in STEM. Overall, students felt that hearing both the technical aspects of a career and a personal story of a person working in a lab made a career in STEM seem more approachable and attainable.

Strands:*Research & Evaluation; Curriculum Development*

**The Impact of the Metagenomics Education Partnership Project on Students: Self-Efficacy, Science-Identity, and Sense of Belonging**

*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 engaged underserved high school students in metagenomic analyses of water samples in Western New York, empowering them to assist in safeguarding local water resources for present and future generations. Participants gained hands-on experience in sequencing and analyzing microbial genomes, leading to the presentation of their findings at a capstone event during the academic year. To assess the impact of MEPP, we analyzed de-identified student survey responses collected by external evaluators during 2022-2023, comparing participating and matched non-participating students. We evaluated students’ self-efficacy, science identity, and sense of belonging to the scientific community at the end of the project by controlling for student demographics such as gender and race/ethnicity and students’ pre-existing status. We employed a multivariate structural equation modeling framework with a robust estimator and full information maximum likelihood (FIML) to address potential assumption violations and missing values for the analysis. We found that participating students exhibited heightened levels of science self-efficacy and a stronger sense of science identity than their non-participating peers. These findings offer promise for advancing student outcomes through SEPA programs, with implications for the enhancement of STEM education and workforce development.

Strands: *Research & Evaluation; Broadening Participation*

**Utilizing Small Group Cognitive Labs for Effective Assessment Item Validation**

*Authors:* Rebecca J. Peterson, University of Utah; Harini Krishnan, University of Utah, Dina Drits, D Cubed Consulting; Louisa A. Stark, University of Utah

This presentation introduces a successfully piloted small group cognitive lab protocol designed to streamline the assessment item validation process. We will share the protocol's key components, including its design, implementation, and data analysis techniques. Additionally, we will highlight the benefits of using this protocol, such as increased efficiency, improved participant engagement, and the ability to capture diverse perspectives in a single session. Guidance will be provided on when and how to effectively utilize the protocol, as well as best practices for conducting successful cognitive lab sessions. The small group cognitive lab protocol represents a powerful tool for researchers, evaluators, educators, and assessment developers to create effective, accurate, and meaningful assessments.

Strand: *Research & Evaluation*

**Concurrent Breakout Sessions #2: Wednesday, 2:30 – 3:45 pm**

**Research & Evaluation Strand**

**Room: Arizona**

**Diversity with dignity: Re-examining approaches of diversity initiatives**

*Authors:*Paul Cotter, EvaluLogic; Ellen Chenoweth, University of Alaska; Arleigh Reynolds, University of Alaska

The NIH and other funders actively advocate diversity in education and training programs to develop a workforce more representative of the U.S. population. Some groups (e.g. Indigenous) remain underserved due, in part, to an assimilation approach to diversity initiatives and an insistence that dominant culture metrics of success be universally applied. Institutions of higher learning have rigid structures steeped in dominant culture traditions, and proposal and publication review processes force the implementation of “accepted” study designs, evaluation strategies, and pedagogies regardless of their alignment with cultural ways of knowing or being. These conflict with institutional and agency missions of diversity. True diversity requires 1) deconstructing academic structures to fully embrace underserved populations through culture- and place-based opportunities derived from the underserved population’s values and interests; 2) decoupling Western Science bias from proposal and manuscript review processes; and 3) assessing initiative efficacy from a cultural perspective, not an institutional one. Critically, this approach acknowledges traumatic histories in education and science, and places Indigenous ways of knowing and Western knowledge systems on an equal plane. We present experiences working with Tribal partners to chip away at institutional barriers to opportunities for rural and Indigenous students and communities in Southeast Alaska.

Strands: *Research & Evaluation; Broadening Participation*

**The Impact of Hands-on Research Experience to URM Trainees**

*Author:* Valoree Solis, The University of Texas MD Anderson

Since 2010, the training programs led by Drs. Khandan Keyomarsi and Stephanie Watowich have helped to train 640 high school and undergraduate trainees during the summer months. In 2020, Drs. Keyomarsi and Watowich were awarded their R25 grant specifically designed to provide hands- on research experience to underserved high school and undergraduate students through both year-round and summer training programs. Annually we collect outcome data on all of our trainee alumni and the results tracking our URM to non-URM trainees are highly impressive and certainly speak to the level of training our students receive and how transformative it is specifically to our underserved trainees.

* 97.4% of our URM trainees have graduated with their bachelor’s degree in a STEM discipline (97.2% for non-URM).
* 55.3% of URM trainees (60.8% non-URM) have matriculated to a graduate program in STEM (some students have acquired or are acquiring a master’s and a doctorate).
* 24.7% of URM trainees, versus 15.1% of non-URM alum, have earned or are pursuing a research-based doctoral degree.
* 97.6% of URM trainees, versus 95.5% of non-URM alum, have been retained in the STEM workforce or higher education pipeline

Strands:*Research & Evaluation; Research Experiences for Students & Teachers*

**Supporting the Personal and Academic Wellbeing of our Student Volunteers by Building Intra- and Inter-personal Assets**

*Authors:* Lindley McDavid, ELRC, Purdue University; Sandra San Miguel, Purdue University; Loran Carleton Parker, ELRC, Purdue University; Ann Bessenbacher, ELRC, Purdue University

At many sites, the Vetahumanz program relies on talented and busy veterinary medical student role models to help deliver the curriculum. These students are essential to creating social environments that enable young people from diverse and underserved backgrounds to have the desirable learning experiences and social interactions needed to lay the foundation for the pursuit of future science learning experiences and science careers. Over the years, our student role models have consistently communicated that their participation in the program provides needed opportunities for their own development as students and people. This presentation will dive into our examination of how the design of a K-4 curriculum can better support the development of volunteer assets that contribute to their overall wellbeing. We will present our longitudinal student role model survey findings that demonstrate how change in students’ intrapersonal assets are predicted by positive interpersonal assets among their peers, faculty and staff, and greater university community. In addition, assets are entered as predictors of change in students’ wellbeing, illbeing and communication competencies. We hope that findings guide the development of our program to better promote positive personal and academic outcomes among our outstanding veterinary medicine students in addition to our young program participants.

Strand: *Research & Evaluation*

**High School Students’ Scientific Identity Improves After Participating in a One-Week SEPA STEM Summer Immersion Program**

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

The UPR SEPA: Asthma Awareness Program offers a one-week summer immersion opportunity to high school students in the STEM areas of Biology, Computer Science, Chemistry, Engineering, and Physics. Students are selected from participating schools and assigned to the workshop of their interest on a first come, first serve. Last year, one hundred and eleven students participated. Students spend half a day on Campus engaged in hands-on activities designed to help them develop content knowledge and skills in one of the STEM disciplines covered in the program. We measured the program’s impact on students’ scientific identity and attitudes towards science through self-administered questionnaires that gather quantitative and qualitative information. Pre- and post-measurements show positive scores for students on all three dimensions of science identity, with significant differences for Biology and Engineering on the dimensions of competence and performance, and for Biology and Chemistry on recognition. Students' attitudes toward science were measured after the program and the results demonstrated a positive attitude. Our results suggest that a short hands-on STEM experience can significantly affect Latinx students’ scientific identity and attitude towards science.

Strand: *Research & Evaluation*

**Thursday, May 30**

**Concurrent Breakout Sessions #4: Thursday, 2:30 – 3:45 pm**

**Science Teaching & Learning and**

**Interactive Multimedia Strands**

**Room: Arizona**

**EvolvingSTEM: a three-dimensional evolution curriculum that uses authentic research to improve student learning and engagement**

*Authors****:*** Abigail Matela, University of Pittsburgh; Vaughn Cooper, University of Pittsburgh

Authentic research experiences help students see themselves as scientists and motivate them to pursue higher education and STEM careers, yet they are rarely provided in secondary schools and almost never in introductory classes serving large populations of students who come from groups that remain underrepresented in scientific fields, including women, racial and ethnic minorities, and economically disadvantaged students. These educational disparities contribute to the persistent lack of diversity in the STEM workforce. To address this issue, we developed EvolvingSTEM (https://evolvingstem.org/), a secondary school curriculum where students conduct their own microbial evolution experiment. Typical evolution curricula rely on abstract narratives requiring little student participation, yet the experience of witnessing evolution occur in real time can be transformative. Moreover, students are trained in several foundational biotechnology laboratory techniques and explore important real-world phenomena, including chronic infections and antimicrobial resistance. In introductory high school biology classes assessed by a delayed intervention method, our curriculum produced significantly greater subject-matter test scores than the established curriculum. In addition, surveys of student attitudes and motivation demonstrate that our program encourages students from varied backgrounds to form a sense of agency as scientists and motivates their interest in related careers.

Strands: *Science Teaching & Learning; Broadening Participation*

**SCI PALS: A structured approach to incorporating socioscientific reasoning in pre-college STEM**

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

The presenters will discuss strategies for integrating the five dimensions of socioscientific reasoning in a biomedical laboratory-based curriculum. Using the framework described by Kinslow et al. (2019), CityLab has organized its curriculum development around SCI PALS (Skepticism, Complexity, Inquiry, Perspective-taking, Affordances & Limitations of Science) to develop a new hands-on laboratory-based investigation of gene editing that facilitates the development of functional scientific literacy. This session will share our work to engage students in personally-relevant and thought-provoking explorations that foster rich discourse, discussion, debate, and argumentation. The session will engage attendees in dialogue about the benefits and challenges of employing the SCI PALS approach, such as the integration of implicit and/or explicit ethical components in addressing wicked problems that are not amenable to simple solutions.

Strands: *Science Teaching & Learning; Curriculum Development*

**Climate Change, Air Quality and Human Health**

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

The Environmental Science through Art (ESTA) team installed air quality monitors throughout the region. Students gathered air quality data from various websites such as Purpleair.com or AirNow.gov and analyzed the data from two different locations associated with wildfires. Students constructed a claim, evidence, and reasoning statement associated with the health effects of climate change. Then, using the climate change and air quality data, students created informational flyers and/or made a short (5 minute) public service announcement to educate the community about air quality. Students then completed an assessment associated with knowledge about climate change. Students explored and learned about new technology, and ways to help reduce climate change. Students shared their knowledge with other community members.

Strands: *Science Teaching & Learning; Curriculum Development*

**wëlamàlsëwakàn “good health”: Creating Health Education Materials in Native American Languages**

*Author:* Amy Lyons-Ketchum, University of Oklahoma

The YES Oklahoma program at the University of Oklahoma has created a series of interactive health education posters in critically endangered Native American Languages as part of our outreach efforts. These posters, created in partnership with the tribal communities the YES Oklahoma program serves, have been both important health education tools and invaluable language revitalization efforts. Each poster contains a featured NAL word/phrase, an audio file or pronunciation guide for that word/phrase, an image, and a health message in English. The translation of health education information into critically endangered and sleeping Native American languages is a crucial form of both health and language advocacy that fosters representation, revitalization, and education efforts. The urgency of language revitalization efforts mirrors the urgency of Native American health disparities, and the translation of health education materials into Native American languages allows tribes to preserve their languages, cultures, and indigenous knowledge when addressing these disparities. By educating tribal members about the serious health issues Native Americans face with translated materials, tribes can begin to combat the distrust of outsiders prevalent in these communities and engage in Community-Based Language Research that benefits the vitality of tribal members and their

Strands: *Interactive Multimedia; Broadening Participation*

**Translating Ideas into Instructional Materials**

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

Modeling for sensemaking is the foundation of 3D Molecular Designs’ collaborative kits, interactive models, and digital media. With 24 years of experience developing instructional materials, we will share our expertise and recommendations on translating an idea into a sensemaking instructional model. Our process begins with a literature review and consulting with an advisory committee of experienced science educators. After determining key concepts, we start building prototypes for science educators and their students to field test. We employ a wide range of technologies and media for our materials, including 3d printing, injecting molding, free-form modeling materials, schematic foam die-cutting, placemat & poster printing; interactive computer media, augmented reality, molecular visualizations, animations, videos, etc. Each type of material has its benefits and limitations. We will also cover our iterative design process, and – the most important aspect – our multidisciplinary team.

Strands: *Interactive Multimedia*

**Concurrent Breakout Sessions #4: Thursday, 2:30 – 3:45 pm**

**Teacher Professional Development and**

**Program Administration Strands**

**Room: Olympus**

**Redefining Professional Development: A Teacher Perspective of the PHAGES SEPA Project The Arkansas Big Data Science approach**

*Authors:*Sarah Urban, Capital High School; Jean Placko, Capital High School

Hear the first-hand accounts from a mentor/mentee pair immersed in the 5-year PHAGES (Phages Helping acquire Genuine Experiences in Science) SEPA Project at Montana Technological University where the traditional professional development models are redefined. Focusing on empowering middle and high school teachers, the program trains participants in mentor/mentee pairs to run remote microbiology labs equipped to discover bacteriophages in public school classrooms. Through thoughtful recruitment and immersive, top-tier professional development, the PHAGES program creates meaningful connections between teachers and the scientific community. Teachers become catalysts capable of sustaining long-term impact on student research experiences and science learning beyond the support of the program.

Strands:*Teacher Professional Development; Science Teaching & Learning*

**Broadening Participation of SEPA Programs Through Expanded Partnerships and Mentoring Relationships**

*Authors:* Charlie Wray, The Jackson Laboratory; Sarah Wojiski, The Jackson Laboratory

The Jackson Laboratory (JAX) was awarded a DEIA mentoring supplement to its Teaching the Genome Generation (TtGG) SEPA program. The supplement provided funds to mentor an outstanding TtGG teacher in the expansion of the program into the Memphis-Shelby County school district in Tennessee. Funding has supported the mentorship of a leading teacher in the school district, creation of a new TtGG regional hub, a professional development course for 18 teachers, and development of new genetics and genomics content focused on social justice-centered science education. The effort supplied laboratory instrumentation, reagents, lessons, and protocols to enable implementation of TtGG curricular components across Memphis-Shelby County Schools (MSCS) system high schools, the largest district in Tennessee serving a population where over half of the students are considered economically disadvantaged. The session will describe how JAX leveraged a teacher partnership model to create a powerful and transformative STEM education hub that allowed an innovative teacher to expand access to modern molecular genetics, bioinformatics, and bioethics resources across their local community.

Strands: *Broadening Participation; Teacher Professional Development*

**Integrating Preservice Teachers into Instructional Time for HSTA-AL Students: A Valuable Learning Experience in STEM Education**

*Authors:* Robin Bartlett, University of Alabama; Michele Montgomery, University of Alabama; Leahrose Mami, Hale County High School; Jerodine Guyton, Pickens County High School

The purpose of the Health Science & Technology Academy of Alabama (HSTA-AL), a theory-driven mentoring program for high school students, is to increase the number of nurses, nurse scientists, and other biomedical scientists from rural counties. One unique aspect of the HSTA-AL program is integrating preservice teachers into instructional time for students during their annual intensive summer camp experience. By incorporating preservice teachers into instructional roles, this initiative not only enhances the learning experience for HSTA-AL students but also provides valuable mentorship opportunities for the preservice teachers to build their STEM knowledge and teaching skills.

Preservice teachers are mentored by experienced high school teachers and university faculty, allowing them to gain practical classroom experience while contributing to the academic development of HSTA-AL students. This collaborative approach fosters a supportive learning environment where teachers, faculty, preservice teachers and students can interact and exchange knowledge.

Furthermore, this integration offers preservice teachers the chance to build their resumes and develop essential teaching skills crucial for their future careers in education. By working with rural students in a STEM-focused setting, preservice teachers gain firsthand experience addressing the unique challenges and opportunities in diverse educational environments and when working with diverse students.

Through this presentation, we aim to showcase the benefits of incorporating preservice teachers into instructional time for HSTA-AL students. This innovative approach enriches the educational experience of both preservice teachers and students and contributes to advancing STEM education and cultivating future educators.

Strands:*Teacher Professional Development; Project Administration*

**Broadening Participation in STEM + Health for Rural Spanish-English Bilingual Communities**

*Authors:* Jafeth E. Sanchez, University of Nevada, Reno Latino Research Center; Ruben K Dagda, University of Nevada, Reno School of Medicine

The Community of Bilingual English-Spanish Speakers Exploring Issues in Science and Health (CBESS) initiative endeavors to cultivate a diverse and bilingual cohort of students interested in STEM and health service professions. Through a comprehensive 17-month curriculum, CBESS aims to recruit and engage four cohorts of rural Spanish-English bilingual high school students in family-engaged career exploration, Next Generation Science Standards, a youth-led summer residential research program, community outreach, and mentoring. With a focus on addressing the pressing need for a more diverse healthcare workforce, particularly in rural areas, CBESS aims to increase STEM and health interest within this unique context. During the past funding period of our SEPA program, the aims were supported in urban areas, and while it was deemed a successful project, there were many lessons learned. Therefore, new opportunities were explored to support a high-needs rural area through the current SEPA project. As such, this short talk will highlight key efforts to broaden participation to rural areas in Northern Nevada. This effort empowers bilingual families, undergraduate mentor researchers, school counselors, and a broad range of leaders who serve as a Community of Practice to have the tools and resources necessary to navigate and succeed in these critical domains.

Strands:*Broadening Participation; Project Administration*

**Engineering a Regenerative Medicine & Biofabrication “Ecosystem” in New Hampshire**

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

The state of New Hampshire is home to a burgeoning regenerative medicine and biofabrication (RM&B) industry cluster, bringing new workforce demands—and opportunities—to the area. A specific aim of the NH CREATES SEPA project is to facilitate the development of an RM&B ecosystem: to foster cross-sector partnerships linking higher education and research (including NH-INBRE), industry, and K-12 teachers, students, and families, to create a regional network that supports a robust RM&B career pipeline. As the ecosystem grows, students will gain opportunities for more RM&B experiences in a wider range of formal and informal educational environments, sparking their interest and supporting their sustained engagement in RM&B. These efforts align with the “develop and enrich strategic partnerships” pathway of Charting a Course for Success: America’s Strategy for STEM Education, which found STEM ecosystems to “broaden and enrich each learner’s educational and career journey” (National Science & Technology Council, 2018). In this presentation we will briefly describe what a STEM ecosystem is and report on the successes, challenges, and lessons learned thus far from our efforts to establish the NH CREATES RM&B ecosystem.

Strands: *Science Teaching & Learning; Broadening Participation; Project Administration*

**Concurrent Breakout Sessions #5: Thursday, 4:00 – 5:15 pm**

**Teacher Professional Development Strand**

**Room: Wyoming**

**Observing Pill Bugs to Develop Phenomena-Based Professional Development for Preschool Teachers**

*Authors:* Tammy Lee, East Carolina University; Virginia C. Stage, NC State University

Science curiosity and learning begin for young children even before formal instruction of kindergarten. Therefore, science professional development for preschool teachers needs to be addressed and become a focus for science educators. Early Childhood teachers have stated the need for professional development on how to effectively implement meaningful science experiences in the classroom. The Preschool Education in Applied Science (PEAS) program is a teacher professional development intervention focused on building science teaching knowledge, interest, and efficacy among Head Start teachers serving children (3-5 years) from historically marginalized backgrounds. This short talk will highlight a key activity we use to engage teachers and teach about the process of science during professional development with Head Start teachers. Our focus is to use a common living organism (pill bug) to observe as part of developing a phenomenon as an anchor to design an investigation for exploring the functions of the structures of a pill bug. We model how to use phenomena to deepen and enrich learning experiences for young children in preschool classrooms. The final stage of professional development is focused on supporting teachers as they brainstorm how to lead young children in developing their phenomena for investigation.

Strands:*Teacher Professional Development; Science Teaching & Learning*

**PEAS Learning Community: How does it work in Early Education Classrooms?**

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

Learning Communities (LCs) are popular in K-12 settings. However, its utility in early education settings is highly debated. In this short talk, the PEAS team will discuss early education teachers’ perspectives and the support needed to implement LCs successfully. The team will showcase the evidence-based PEAS LC Guide developed for early education settings highlighting the iterative process used to create the guide, including implementation, challenges experienced, and teacher-shared success stories.

Strands: *Teacher Professional Development; Research & Evaluation*

**STEAM Teacher Professional Development in an Underserved Elementary School**

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

Delivering STEAM teacher professional development to elementary teachers in an underserved school in the Arkansas Delta. Presenters will discuss project-based learning and performance-based assessment techniques used to engage teachers and students, lessons learned, best practices, increases in teacher efficacy and a newfound willingness to try new STEAM curricular approaches. Presenters will also share data from the first year of the SEPA project.

Strands: *Teacher Professional Development; Curriculum Development*

**From Recruitment to Retention: Building Relationships, Community & Models**

*Author:* Karen Avery, EdD, Pennsylvania College of Technology

Science teachers today face unprecedented demands – from captivating crafting lessons to mastering pedagogical techniques to communicating with students and parents, all while keeping abreast of the rapid pace of scientific advancements. With so many demands on their time, how can we entice them to actively participate in professional learning that nurtures their content knowledge, pedagogical skills, and Next Generation Science Standards (NGSS) practices?

3D Molecular Designs and MSOE Center for BioMolecular Modeling have supported teachers and their learning for 24 years. Discover how these organizations – now merged – consistently fill their summer courses and cultivate a devoted following. Their courses engage educators in modeling – a community-building activity – and empower educators to dive deep into scientific content and effective teaching methods. 3D Molecular Designs then offers tangible strategies for integrating newfound knowledge into classroom practice. This presentation shares how 3D Molecular Designs engages educators in effective professional learning, community building, and pedagogical practices.

Strands: *Teacher Professional Development*