

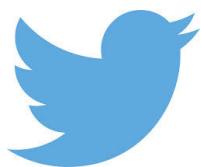
International Teacher-Scientist Partnership Conference

Conference Program

Poster Session &
Lesson Expo Abstracts

February 11-12th, 2015
Hilton Financial District, San Francisco





Twitter hashtags:
#itspconference
#STEMpartnerships

**International Teacher-Scientist Partnership Conference
February 11-12, 2015
Hilton San Francisco Financial District
San Francisco, CA**

Agenda

Wednesday, February 11

8:00-9:00am **Registration & Breakfast**
Grand Ballroom

9:00-9:15am **Welcome**
Grand Ballroom Katherine Nielsen & Rebecca Smith - UCSF Science & Health Education Partnership
Betty Calinger - American Association for the Advancement of Science

9:15-9:45am **The Roles of Scientists in Science Education**
Grand Ballroom **A Discussion between Bruce Alberts and Shirley Malcom**
Bruce Alberts, Professor Emeritus, UCSF; Former Editor-in-Chief, *Science* magazine;
Former President, National Academy of Sciences
Shirley Malcom, Director for Education and Human Resources Programs, AAAS
Moderator: *Kishore Hari*
See bios on page 12

9:45-10:00am **Break**

10:00-10:30am **30 minute break-out sessions**

Grand Ballroom **How Teacher Research Internship Experiences Change the Face of Science Teaching**
Bonnie Harris - Georgia Intern-Fellowships for Teachers (GIFT), Georgia Tech
Casey Bethel - New Manchester High School, Douglasville, Georgia

With the quality of teaching being essential to student achievement, a coordinated, integrated approach by university researchers and high school science educators can prove invaluable to enhancing the teaching of science. When teamed with researchers in summer internships, teachers experience practical uses of science in everyday living, resulting in expanded awareness of careers in science, increased teacher content knowledge, and new teaching strategies. Attendees in this session will learn how the transfer of summer research experience into educational modules can make science coursework more approachable. Focusing on specific strategies for increasing classroom engagement and breathing new life into curriculum, participants will learn how a series of lessons, activities, and assignments can be used to teach specific concepts and draw connections to daily life for students.

Mason I **Expanding the Reach of Science Education Programs: Strategies for Implementing at New Sites**
Tzipor Ulman & Susanna Mlynarczyk-Evans - Science is Elementary

Science is Elementary (SiE) is a science education non-profit based in Silicon Valley. We work to effect systemic change at the elementary school level with a multi-pronged approach: working directly with students, training teachers, and engaging professional scientists and engineers from the community. Utilizing an innovative, inquiry-based program for preK-5th grade, we provide value to teachers by emphasizing science and engineering practices, and offer a low-commitment, high-reward volunteer opportunity for science and engineering professionals. SiE has begun expanding its program in two ways: a pay-for-service model for local schools and a licensing model for remote sites. We will discuss strategies for expanding and sustaining science education programs, and share lessons we have learned.

Mason II **Teacher-Scientist Partnerships Catalyze Change in the Academy**
Eleanor Miele, Wayne Powell, and Jennifer Adams - Brooklyn College/CUNY

Fifteen years of partnership and collaboration between teachers and scientists at our urban, public college has catalyzed a fundamental change in the character of the Department of Earth and Environmental Science. An examination of changes in the faculty profiles and priorities and course descriptions and goals reveals a substantial change in the culture of the department, impacting both teacher preparation programs and earth science courses for science majors.

Montgomery **A National Model for Retired STEM Professionals Supporting K-12 Education**
Christos Zahopoulos & Daniel Sullivan - Center for STEM Education, Northeastern University

Founded in 1991, the RE-SEED program at Northeastern University seeks to improve student interest and outcomes in STEM by training and supporting retired volunteer scientists, engineers and other STEM professionals who assist K-12 STEM teachers and students. We will share our model, information on our trainings for scientist volunteers, and outcomes of the program.

Washington **Using Informal Science Experiences to Increase Public Genetic Literacy**
Carla Easter & Christina Daulton – National Human Genome Research Institute

In 2011, the National Human Genome Research Institute partnered with the Smithsonian Institution’s National Museum of Natural History to create an innovative exhibition “Genome: Unlocking Life’s Code” to give the public a window into genomic science and its many applications. We will share data from our survey that shed a particular light on the role that informal science experiences can play in increasing a person’s genetic literacy, curiosity, and desire for more knowledge and relevance in one’s life.

10:30-10:45am Break

10:45-11:45am 60 minute break-out sessions

Grand Ballroom **Working Group: Research Experiences for Teachers**
*Facilitators: Marty Coon & Steve Triezenberg - Van Andel Education Institute
 Bonnie Harris - Georgia Intern-Fellowships for Teachers (GIFT)*

There are many different models of Research Experiences for Teachers (RET) programs, all of which seek to provide teachers with authentic and immersive research experiences with the goal of enriching teaching. Join us for this working group to share expertise and build community. Bring your questions and challenges to probe the collective experience of your colleagues. Possible topics include: supporting the translation of the research experience to the classroom, measuring impact, developing a community of teacher alumni, sustaining funding, and more.

Mason I **What Did They Learn? Using Multimodal Analysis of Student Work to Document STEAM Learning**
*Janice Dawe, Zachary Meyers & Joan Parker-Webster - University of Alaska Fairbanks
 Chris Pastro - Fairbanks North Star Borough School District*

STEAM is an expanded definition of STEM that includes the arts. The integration of arts into traditional STEM lessons provides access to STEM learning to students who don’t typically think of themselves as “science types” and creates a rich opportunity for authentic assessment of student understanding. In this interactive session, the Fairbanks STEAM Institute faculty will present: (a) an overview of the STEAM conceptual and organizational framework for the Institute; (b) a “day in the life” of the Institute, illustrating the integrative, multimodal approach utilized; (c) the theoretical framework for multimodal research/assessment methodology and data analysis; (d) examples of multimodal categories emerging from the Grinnell Journals (Nature Journaling notebook); (e) examples from multimodal technology-based extensions; and (f) examples of lesson plans generated by teachers attending the Institute.

Mason II	<p>From Lab to Classroom: Developing Science Discourse Tools for Teachers <i>Teresa Barnett & Sasha Stackhouse - Community Resources for Science</i></p> <p>In response to NGSS, K-8 classroom teachers need support in building a deeper understanding of how scientists and engineers communicate in their work, and how to adapt strategies and structures of STEM discourse from professional and university settings into classrooms. Participants will discuss models of science discourse, such as Lab Meetings; examine sample templates and tools; and work together to develop resources for teachers to understand and engage students in communicating “like a scientist.”</p>		
Montgomery	<p>Working Group: Retirees in Partnerships <i>Facilitators: Christos Zahopoulos & Daniel Sullivan - Center for STEM Education, Northeastern University</i></p> <p>This working group seeks to bring together program representatives who currently work with retired scientists or who are interested in tapping this rich human resource within their own communities. This session will be an opportunity for us to share expertise and build community while also providing feedback to the facilitators regarding the RE-SEED program at Northeastern University. RE-SEED is currently in the process of refining the existing program model to be more scalable and seeks partners who may be interested in being part of a national network with regional RE-SEED hub sites.</p>		
Washington	<p>Preparing Partnership Teams for Success <i>Lakisha Witzel, Jean MacCormack, Julia La Manna, Sejal Patel - UCSF Science & Health Education Partnership</i></p> <p>The Science and Health Education Partnership (SEP) at UC San Francisco has been supporting scientists and teachers working together for over 25 years. Join us as we present core practices from our experience in preparing partnership teams to co-plan and co-teach successfully in K-12 classrooms. During this session, hear from SEP about effective structures and strategies that we use with our program participants and share your contributions to this valuable effort.</p>		
11:45-12:45pm Grand Ballroom	<p>Lunch: Choose a Discussion Group or start your own Enjoy lunch while discussing topics related to teacher-scientist partnerships. Choose from one of the following topics or suggest your own! Topics will be posted on tables.</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> • Recruiting Teachers • Next Generation Science Standards • Funding and Sustaining Programs • High School Intern Programs • STEM Professionals in Partnerships • Technology Use in Partnerships </td> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> • Recruiting Scientists • Evaluation of Partnerships • Rural Partnerships • Curriculum Development • Careers for Scientists in Science Education • Getting the Word Out – Leveraging traditional and social media </td> </tr> </table>	<ul style="list-style-type: none"> • Recruiting Teachers • Next Generation Science Standards • Funding and Sustaining Programs • High School Intern Programs • STEM Professionals in Partnerships • Technology Use in Partnerships 	<ul style="list-style-type: none"> • Recruiting Scientists • Evaluation of Partnerships • Rural Partnerships • Curriculum Development • Careers for Scientists in Science Education • Getting the Word Out – Leveraging traditional and social media
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12:45-1:15pm	<p>30 minute break-out sessions</p>		
Grand Ballroom	<p>The Great Diseases: Connecting Science Practice to STEM Career Awareness <i>Stephanie Tammen & Berri Jacque - Tufts University</i></p> <p>Tufts University scientists and Boston teachers have developed a Biology II curriculum “The Great Diseases” that promotes scientific and health literacy by incorporating authentic science practice and promoting STEM career awareness. We will show how, using a collaborative web-based technology, students work in teams in an interactive role-playing problem-based simulation that guides them to design experiments, predict results and analyze data in the guise of developing a novel therapeutic.</p>		

Mason I **West Virginia Clinical Translational Science Institute Links Scientists and Teachers**
Sara Hanks, Ann Chester & Summer Kuhn - West Virginia Health Sciences & Technology Academy, West Virginia University

The community-based Health Sciences and Technology Academy of West Virginia follows a unique model for successful scientist-teacher partnerships by working closely with the WV Clinical Translational Science Institute. This session will focus on the practices of Community Research Associates in their role as the link between scientists/researchers and teacher/ community members/ students. Best practices of linking university faculty and teachers to engage in meaningful projects will be outlined.

Mason II **What Does an Engineer Do? Student Conceptual Change from GK12 Participation**
Vincent Genareo - Iowa State University's Research Institute for Studies in Education (RISE)

This session describes methods and results of 4 years of pre- and post-survey data administered to middle school students with a GK12 fellow. On an open-ended item, students gained significantly ($p < .001$) in their understanding of engineering during their participation. The more engaged students were with their scientists, the more they gained in their conceptualization. Implications for teacher-scientist programs, particularly the importance of student-scientist interactions, are described.

Montgomery **Leveraging Teacher Research Experiences: Creating and Disseminating Curricular Modules**
Houda Darwiche & Julie Bokor - University of Florida Center for Precollegiate Education and Training

Attendees are invited to participate in an interactive discussion on translating teacher research experiences into deliverables. Session content is based on the development of hands-on, inquiry-based curricular units as part of our Biomedical Curriculum Series, created by teacher fellows participating in our Summer Research Experience program. Session will focus on the creation and dissemination of project deliverables, and will also include tips for success and lessons learned from four years of program implementation.

Washington **Learn, Protect, and Stay: A Model for Linking Formal and Informal Science**
James Bader - Case Western Reserve University
Terri Wade - Lyles & Kirsten Mahovich, Cleveland Metropolitan School District
Denny Taylor - Hiram College

Learn about the Cleveland Metropolitan School District strategic plan for science that outlines a strategy to integrate the contributions of local scientists into the district scope and sequence at an unprecedented scale. Building on past successes of the Learn, Protect, and Stay philosophy developed by CMSD district science leaders, the science program is a regional effort that serves as a model for other medium and large urban districts.

1:15-1:30pm Break

1:30-2:30pm 60 minute break-out sessions

Grand Ballroom **Careers for Scientists Away from the Bench**
Moderator: Ben Koo - UCSF Science & Health Education Partnership
Panelists:

Shannon Behrman - iBiology *Raquel Gomes - College Preparatory School*
Hilleary Osheroff - Exploratorium *David Lally - Virginia Tech*

For some scientists, teacher-scientist partnerships ultimately lead to careers beyond the lab bench. Panelists in this session, now in careers in science education, science communication, and informal science, will share their thoughts on "leaving the bench" and the paths they took to do so.

Mason I **Capturing the Impact of the Research Experience**
Jennifer Hammond - NOAA Teacher at Sea Program
Janet Warburton & Sarah Bartholow - PolarTREC
Diana L. Payne - Connecticut Sea Grant
John Baek - NOAA Office of Education

Two programs of national scope, PolarTREC (Teachers and Researchers Exploring and Collaborating) and NOAA’s Teacher at Sea Program will host a symposium on advanced program development. We will specifically address the topics of analyzing intra-participant (participant to participant) social networks as well as capturing the impact of their role as teacher-leaders within their professional communities.

Mason II **Promoting Student Inquiry through Strategic Teacher-Scientist Partnerships**
Cheryl A. McLaughlin & Sean Moran - Florida Museum of Natural History
Julie Bokor - University of Florida
Jennifer Broo - Saint Ursula Academy

Our project involves a teacher-scientist partnership mediated by an education and training institute committed to the transfer of scientific research to K-12 classrooms and the wider society. In this session, four stakeholders will discuss the role the partnership played in the design and implementation of a high school biology unit on horse evolution. We will also include lessons learned from this partnership as well ongoing initiatives to include more K-12 teachers.

Montgomery **Working Group: National Alliance for Broader Impacts, A New Collaborative to Improve Broader Impacts**
Facilitators: Kevin Niemi - National Alliance for Broader Impacts (NABI), University of Wisconsin-Madison
Kemi Jona - National Alliance for Broader Impacts (NABI), Northwestern University
Jane Horwitz - University of Pennsylvania

Broader Impacts (BI) are part of every NSF proposal. The BIONIC (Broader Impacts & Outreach Network for Institutional Collaboration) grant proposal was recently funded by NSF to establish a network of BI professionals. The National Alliance for Broader Impacts (NABI) is the result. This session will share exemplary programs that connect scientists and teachers and begin the discussion within NABI on how to engage scientists more effectively to meet the needs of classroom educators.

Washington **Working group: New Roles for Scientists in Science Education**
Facilitators: Elise Zolczynski & Teresa Barnett - Community Resources for Science
Rob Hoffman - Pajaro Valley Unified School District
Max Tarjan & Kristin De Nesnera – University of California, Santa Cruz

Join this working group to share and discuss successful ways to engage scientists in science education, with an emphasis on scientist mentoring programs that support classroom teachers and student-designed investigations. Bring your experiences, suggestions, challenges, and questions to share.

2:30-2:45pm Break

2:45-3:15pm 30 minute break-out sessions

Mason I **Creating and Sustaining National and Regional Alumni Networks**
Jennifer Annetta, Jennifer Hammond & Stacey Klimkosky - NOAA Teacher at Sea Program

Learn how to build an active national and regional alumni network that creates a sustainable collaboration among educators, scientists and the community after the Teacher Research Experience (TRE) ends. The NOAA Teacher at Sea Program will share their alumni model for continuing the TRE long after it is over. Critical to this network and to the program’s mission is nurturing in-person interaction of alumni who share similar research experiences.

Mason II

A Model for Interscholastic and International High School Research Collaboration

George Wolfe - Loudoun County Academy of Science

Imagine a high school student designing a project, seeking out a scientist partner, and collaborating with students from around the world. This session will explore a model that guides students through the design process of independent, mentor-guided research. In addition, we will highlight a program that has students working together with scientists as well as several international collaborations. Through this workshop we hope to develop a network of potential collaborators.

Montgomery

A Model For Scientist and Teacher Partnering InSciEd Out

Tyler Koep - University of Minnesota

Rebecca Haehnel - Independent School District 197

Integrated Science Education Outreach (InSciEd Out) is a unique partnership between the Mayo Clinic, the University of Minnesota, and local K-12 classrooms that has led to significant improvements in student engagement and proficiency in science. This session will discuss strategies for developing meaningful relationships between local schools and partner institutions capable of securing funding for dedicated programs. Our model is predicated on leveraging early partnering to obtain funding from a variety of public and private sources across science, education and community health.

Washington

Reconstructing a Giant: Teacher-Scientist Collaboration Using 3D Technology

Claudia Grant - Florida Museum of Natural History, University of Florida

Robert Hoffman - Pajaro Valley Unified School District

With the increasing availability of 3D printers, we have developed a transferable product where teachers partnered with scientists to develop lessons and 3D models based on the extinct giant shark: *Carcharocles megalodon*. Through the study of 3D printed fossil teeth and the use of a national digitization portal iDigBio, this activity provides opportunities for STEM integration and greater understanding of evolution and extinction during a K-12-driven re-construction of a 3D-printed megalodon jaw.

3:30-5:00pm
Grand Ballroom

Poster session and Lesson Expo

Poster Session A: 3:30-4:15 (Even numbered posters)

Poster Session B: 4:15-5:00 (Odd numbered posters)

6:00-8:00pm

Evening Reception at the Palio D’Asti, 640 Sacramento St., San Francisco

More info and map on page 33

***You need to be registered for the reception. See the registration desk if you want to register. If you are registered and you no longer can join us, please let the registration desk know to allow people from the wait list to come in your place.

Thursday, February 12

8:00-9:00am
Grand Ballroom

Breakfast

9:00-9:30am
Grand Ballroom

Where are scientists needed in science education? What roles can they most effectively Grand play?

Helen Quinn, Professor Emeritus, SLAC National Accelerator Laboratory, and former Chair NRC Board on Science Education
See bio on page 12

9:30-9:45am

Break

9:45-11:15am

90 minute break-out sessions

Grand Ballroom

Understanding How People Learn: A Critical Skill for Science Communicators

Dennis Schatz - Pacific Science Center
Suzanne Gurton - Astronomical Society of the Pacific (ASP)
Andrew Fraknoi - Foothill College

Understanding how people learn is a critical skill in any type of communication, but is especially critical when conveying scientific and technical information. Come learn more about how Portal to the Public, a NSF-funded effort in 43 locations across the country, and the Astronomy Ambassador Program of the American Astronomical Society include professional development experiences focused on understanding how people learn and the use of this knowledge to better communicate with public audiences.

Mason I

Transforming Cookbook Labs into Inquiry Labs

Margaret Shain Stieben - American Physiological Society

Participants will learn a hands-on approach to transforming existing lessons to help implement Next Generation Science Standards and/or Vision and Change in their classrooms. Learn to apply APS Six Star Science principles for student-centered learning to labs you currently use. Attendees are encouraged to bring a lab which they would like to adapt or can use one of the samples provided. Take home "tool kits" will enable participants to apply Six Star Science principles to additional lessons.

Mason II

Enhancing Teacher-Scientist Partner Understanding of the Systems Nature of STEM Research

Annamarie R. Ward, Matthew Johnson & Leah Bug - Penn State Center for Science and the Schools

Our workshop engages participants with a systems thinking-based strategy for helping teachers and novice researchers better understand the dynamic nature of authentic STEM research. Workshop goals include 1) helping teachers understand the practices involved in authentic research and their use in the classroom, 2) helping novice researchers organize and situate their research, and 3) providing experienced researchers a tool/strategy to help advance their undergraduate and graduate students.

Montgomery

Keep your Lesson Plans off the Chopping Block!

Maureen Griffin & Eric Hall - Hoover High School

Helping teachers and scientists develop quality lessons before a classroom experience can be a challenge. Attendees will experience a competitive activity similar to the TV show *Chopped*, in which they will work together to cook up a lesson that has all the necessary ingredients to satisfy your pedagogical appetite. If you are looking for a way to engage a teacher-scientist pair in a fun and challenging lesson planning design session, make a reservation with us!

Washington

Examining Tools to Measure Student Perceptions of Scientists: A Critical Look at the Draw-A-Scientist Test (DAST)

Susan Hillman, Henrietta List & Charles Tilburg, University of New England

This interactive workshop explores a popular instrument, Draw-A-Scientist Test (DAST), used to investigate students’ perceptions of scientists. Participants will be guided through several activities to discern the efficacy and limitations of the DAST. Our research on this tool then will be shared with implications for practice. Further discussion will focus on how students’ perceptions of scientists may be changing and how this is but one part of measuring students’ attitudes toward science.

11:15-11:30am

Break

11:30-12:00pm

30 minute break-out sessions

Grand Ballroom

Developing Relevant STEM Curriculum: IISME’s Education Transfer Plan

Shari Liss - Industry Initiatives for Science and Math Education

Highlighting several case study examples, we will look at how IISME helps Teacher Fellows identify relevant 21st Century Skills and develop curriculum to transfer those skills to their students. Each IISME Teacher develops an Education Transfer Plan (ETP) which is essentially a blueprint for how they will translate what they have learned working for their host organization into improved classroom instruction. We will also explore how Common Core and NGSS support this process, and help teachers succeed.

Mason I

Science Immersion for Middle School Students

*Nancy Moreno, Barbara Tharp and Beatriz Perez-Sweeney - Baylor College of Medicine
Jyoti Malhan - Baylor College of Medicine Academy at Ryan, Houston Independent School District*

Sixth grade students in Houston’s new Baylor College of Medicine Academy at Ryan are learning neuroscience through a hands-on course developed by scientists and educators. The course is just one aspect of a new and innovative open-admissions STEM education partnership between the Houston Independent School District and Baylor College of Medicine. We’ll share our model and what we already are learning about broadening opportunities for success of diverse students in STEM areas.

Mason II

Scaling Up from NYC to Upstate NY: The Importance of being Flexible

*Kristian Breton - New York Academy of Sciences
Brandon Murphy - SUNY College of Environmental Science and Forestry*

In August of 2012 the Academy and the State University of New York were awarded a \$2.95 million grant to expand the Academy’s mentoring program between graduate students or postdoctoral fellows and under-served youth during after-school time. Now in the last year of the grant, the program has been implemented at six unique campuses and been adapted to meet local needs. This session will detail those adaptations, lessons learned, and then ask attendees to problem-solve together how similar models could be adapted to their local needs.

Montgomery

Preparing Student Scientists: Teaching High School Students to Read the Primary Research Literature

*Catharine Boothroyd - The Masters School
Elizabeth Waters - The Rockefeller University Science Outreach Program*

We will discuss our collaboration that brings scientists into the high school classroom and builds a meaningful, collaborative, and mutually beneficial relationship. One of the main components of a research course at Masters is to interact with scientists from Rockefeller University. The focus of this session is strategies used to prepare *students* for these visits, with a particular emphasis on the reading of primary literature.

Washington

GSTAR: Developing a High School Learning Module through Science Research

Joanna Corby & Loreto Barcos - University of Virginia
Timothy Spuck & Kartik Sheth - National Radio Astronomy Observatory
Jeff Prillaman - Albemarle High School

GSTAR is supported by the Hubble Space Telescope (HST) and implemented by researchers at the National Radio Astronomy Observatory. It uses original HST data to enable a research experience for five local high school students and scientific research immersion for a high school educator. Through the partnership between scientists, students, and the educator, a learning module emerges from the original research. We discuss implementation of the program and the classroom learning module.

12:00-1:00pm
Grand Ballroom

Buffet Lunch

1:00-2:00pm

60 minute break-out sessions

Grand Ballroom

Shared Evaluation: Collaborative Around Research Experiences for Teachers

Shari Liss - Industry Initiatives for Science and Mathematics Education
John Keller - California Polytechnic State University, San Luis Obispo

Through support from *100Kin10*, representatives from five teacher-researcher programs serving pre-service or in-service educators are collaborating to share program goals, curriculum, implementation, and most importantly ways that these programs are evaluated. During this symposium, we will discuss both individual and shared evaluation tools and outcomes and explore opportunities for other programs to join the *Collaborative Around Research Experiences for Teachers* (CARET).

Mason I

Changing Students' Perceptions of Scientists Through Partnership Programs

Kristin Bass - Rockman et al.
Rebecca Smith, UCSF Science & Health Education Partnership (SEP)

Even in 2015, many students hold fast to the stereotype that scientists are old and boring, and typically male and white. Partnership programs provide powerful opportunities for students to interact with diverse scientists in a variety of fields and stages of their careers, helping students to revise their perceptions of scientists – and critically, of who can become a scientist. This session will begin with a presentation of outcome data from an NIH Science Education Partnership Award (SEPA)-sponsored program at UCSF that supported year-long partnerships in high school classrooms. While there were important outcomes from each of the participant groups – teachers, scientist volunteers, and students, the outcomes discussion will focus on impacts on students' perceptions of scientists. We will then transition to a whole group discussion to think together about how to best make the case for partnerships – who benefits, how, and how do we best document and share these outcomes.

Mason II

Sharing and Brainstorming Ideas for Teacher-Scientist-Engineer Partnerships

Jessica Huang & Mikala Streeter -Stanford Graduate School of Education

Members of the Stanford Learning, Design and Technology Program will engage conference attendees around promising teacher-scientist-engineer partnerships drawing from our own experiences, and generate new ideas about how to make these partnerships more effective. The session will feature short, interactive demonstrations with audience participation to spark discussion, and end with a group brainstorming and prototyping activity. Ideas generated can be shared with the conference community and beyond.

Montgomery

Using a Network to Build and Sustain Partnerships

Brenda Britsch & Karen Peterson - National Girls Collaborative Project

The National Girls Collaborative Project (NGCP) is a robust network of organizations committed to informing and encouraging girls in STEM. NGCP models a collaborative structure to empower a

network of professionals, researchers and practitioners to collaborate and create partnerships at the state and local level. Participants will engage in activities designed to facilitate collaboration, learn about the NGCP Program Directory and learn strategies for creating and sustaining partnerships.

Washington

Working Group: Partnerships in Rural Communities Form Viable and Meaningful Partnerships

Jan Straley & Ashley Bolwerk - University of Alaska and Sitka Sound Science Center
Summer Kuhn - West Virginia Health Sciences & Technology Academy

Teacher-scientist partnerships in rural communities need to overcome a unique set of obstacles. We will start by defining the meaning of rural and assess the similarities and differences among our communities from a cultural, and geographic, perspective. Topic discussions will come from the participants and may include how to bring a scientist into the community to maximize the impact, selection of the best scientist partners, the use of technology to bridge long distances, relationship building between communities and scientists, what it really means to be remote and isolated and how to manage the scientific community when data becomes an extracted resource. Join this working group to share in this discussion, drawing from the experiences from participants; we will strive towards describing a successful teacher-scientist model for rural communities.

2:00-2:15pm

Break

2:15-3:15pm

60 min break-out sessions

Grand Ballroom

Recruiting and Preparing Scientists for Success in K-6 Classrooms

Sasha Stackhouse, Teresa Barnett & Elise Zolczynski - Community Resources for Science

This session will introduce the Bay Area Scientists in Schools (BASIS) model and tools used for preparing scientists and engineers for success in K-6 classrooms. An interactive component will lead participants through an exercise designed to help scientists develop skills in presenting their research and scientific areas of focus to a non-scientist audience.

Mason I

Working Group: The Future of the Partnership Community

Katherine Nielsen & Rebecca Smith, UCSF Science & Health Education Partnership (SEP)
Dennis Schatz - Pacific Science Center

What next steps do we as a community want to take? How can we work together to further advance the teacher-scientist partnership field? What role can you envision yourself taking? Come join us and share your ideas for the future.

Mason II

Working group: Teacher Field Experiences

John Wood - Fountain Valley School District - Talbert Middle School
Regina Brinker - Granada High School

A great number of Field Experiences are available for teachers, from exploring the Alaskan and Siberian tundra, glacier conditions on Mt. Kilimanjaro, to volcano dynamics in Antarctica. Teacher-researcher collaborations provide invaluable training for teachers, increasing their understanding of how science is carried out, and how scientific concepts relate to real-world applications. Join this working group to share expertise and build community. There are many possible topics we may choose to discuss depending on the interests of the group including ways for creating and maintaining effective collaborative projects, building networks for sharing information on local and global levels and benefits for participating scientists especially in regards to research grants.

Montgomery

Social Support Techniques for Building Scientist-Teacher Partnerships

Ann Chester, Cathy Morton McSwain, Mary L. McMillion, Sara Hanks & Summer Lee Kuhn
- West Virginia Health Sciences & Technology Academy, West Virginia University

Teacher-scientist partnership building needs a social component. Because the work cultures of teachers and scientists are so different, social reinforcement can be as important in building

partnerships as content knowledge and research rigor. Methods to surround scientists and teachers in social situations to foster synergistic outcomes will be presented. We will focus on improving science literacy and discovery through knowledge brokers, research huddles, high school pipeline programs, and more.

Washington

Building Relationships and Trust Between the Local Community and STEM Professionals

Jan Straley - University of Alaska and Sitka Sound Science Center

Building relationships and trust between the local community and STEM professionals

Jan Straley - University of Alaska and Sitka Sound Science Center

In rural Alaska, for many reasons there is often a general mistrust of western science. Within this landscape, the Sitka-based Scientists in the Schools (SIS) program has operated for nearly 20 years. SIS has been successful in overcoming challenges in establishing a culture of science within the K-12 grades in the Sitka School District. SIS is now seeking to expand state-wide. This session will showcase grade level SIS activities and demonstrate how we have changed perspectives towards science education in rural Alaska.

3:15-3:30pm

Break

3:30-4:00pm

Closing Remarks

Speakers

Bruce Alberts

Bruce Alberts, a prominent biochemist with a strong commitment to the improvement of science and mathematics education, was awarded the National Medal of Science by President Barack Obama in 2014. Dr. Alberts served as Editor-in-Chief of *Science* (2009-2013) and as one of the first three United States Science Envoys (2009-2011). Dr. Alberts is also the Chancellor's Leadership Chair in Biochemistry and Biophysics for Science and Education at the University of California, San Francisco, where in 1987 he co-founded the Science & Health Education Partnership.

Dr. Alberts served two six-year terms as the president of the National Academy of Sciences (NAS) in Washington, D.C. During his tenure at the NAS, he was instrumental in developing the landmark *National Science Education Standards* that promote "science as inquiry" teaching. Dr. Alberts is one of the original authors of *The Molecular Biology of the Cell* and has earned many honors and awards, including 16 honorary degrees. He currently serves on the advisory boards of more than 25 non-profit institutions, including the Gordon and Betty Moore Foundation.

Shirley M. Malcom

Shirley M. Malcom, Director for Education and Human Resources (EHR) Programs at AAAS, has served as a program officer in the NSF Science Education Directorate; an assistant professor of biology, University of North Carolina, Wilmington; and a high school science teacher. Malcom received her PhD in Ecology from the Pennsylvania State University; Master's in Zoology from the University of California, Los Angeles; and Bachelor's with distinction in Zoology from the University of Washington. In addition, she holds 16 honorary degrees.

Malcom serves on several boards, including the Heinz Endowments, Public Agenda, Digital Promise, and the National Mathematics and Science Initiative. She serves as a trustee of Caltech and as a Regent of Morgan State University. In 2003, Malcom received the Public Welfare Medal of the National Academy of Science, the highest award granted by the Academy. She was a member of the National Science Board, the policymaking body of NSF, from 1994 to 1998, and of the President's Committee of Advisors on Science and Technology from 1994 to 2001.

Helen R. Quinn

Helen Quinn is Professor Emerita of Particle Physics and Astrophysics at SLAC National Accelerator Laboratory. She received her Ph.D in physics at Stanford in 1967. She has taught physics at both Harvard and Stanford. Dr. Quinn is an internationally recognized theoretical physicist who holds the Dirac Medal (from the International Center for Theoretical Physics, Italy), the Klein Medal (from The Swedish National Academy of Sciences and Stockholm University) and the Sakurai Prize (from the American Physical Society). She is a member of the American Academy of Arts and Sciences, the National Academy of Science and the American Philosophical Society. She is a Fellow and former president of the American Physical Society. She is originally from Australia and is an Honorary Officer of the Order of Australia.

Dr. Quinn has been active in science education for some years. She served as Chair of the US National Academy of Science Board on Science Education (BOSE) from 2009-2014. She served as a member of the BOSE study that developed the report "Taking Science to School" and chaired the committee for the "Framework for K-12 Science Education", which is the basis of the Next Generation Science Standards (NGSS) that have now been adopted by multiple states in the US. She also served on the committee that developed the report "Developing Assessments for the Next Generation Science Standards".

Poster session

February 11th, 3:30-5:00pm

Abstracts

Posters are organized alphabetically by institution or project. Email contacts are provided

1 American Physiological Society

Margaret Shain Stieben
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The American Physiological Society's Frontiers in Physiology Program

Frontiers in Physiology, the flagship K-12 program of the American Physiological Society (APS) for twenty years, provides the opportunity for middle/high school teachers to spend a summer in an APS member's research lab along with a year-long online professional development course. Researchers and teachers create long term bonds that carry over into outreach events at participant schools during PhUn Week, campus visits for students, and career changing PD for teachers. Details of the programs evolution will be shared.

2 Arctic Research Consortium of the United States

Sarah Bartholow
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Additional author: Janet Warburton

To the Extremes! A Teacher Research Experience Program in the Polar Regions

This poster speaks to the PolarTREC program's best practices developed through a decade of nationwide success and on-going program evaluation. PolarTREC (Teachers and Researchers Exploring and Collaborating) is a NSF-funded program in which K-12 teachers spend 3-6 weeks participating in hands-on field research experiences in the polar regions. The goal of PolarTREC is to invigorate polar science education and understanding by bringing educators and polar researchers together. The teacher and researcher network accelerates the exchange of knowledge in science and classroom implementation throughout disciplines. Including teachers on field research projects helps the team garner support via authentic, and tangible communication efforts to policymakers, funders, students, and the public. The professional relationships built between the teacher cohort and the researchers involved are career-long benefits for both, and improves the science experience for students in the classroom.

3 Broad Institute of MIT and Harvard

Rachel Gesserman
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Additional author: Vivian Siegel

Developing Authentic Science Experiences for Students

The Broad Institute of MIT and Harvard is the world's leading research institute in genomic medicine. The Broad's education and outreach program aims to create partnerships with local educators to give students an understanding of what it means to be a scientist at the institute. One focus of these partnerships is for students to conduct their own science investigations using the same data and techniques Broad scientists use. Working closely with researchers and high school teachers, curricula are being developed related to topics like cancer and Ebola that challenge students to come up with their own conclusions and interpretations of the data. To further expose students to real science, a partnership with local middle schools allows scientists to contribute to a ten-week unit on genetics and evolution by designing and teaching a lesson related to class material and their research. This initiative further develops scientists' communication skills while inspiring interest in STEM.

4 California Polytechnic State University

John Keller
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RECON: Students Across the Western US Measuring the Outer Solar System

RECON, the Research and Education Collaborative Occultation Network, is an innovative teacher-scientist partnership to measure the sizes and characteristics of Kuiper Belt Objects (KBOs) out beyond the orbit of Neptune. The project provides telescopes and training to teachers in over 40 communities spaced every 50 km across the entire Western US. This citizen science observation network will be sensitive to KBOs down to 100 km in size as they occult, or pass in front of, distant stars. Over the past two years, a pilot project involving 13 schools has demonstrated the ability of teachers

and community members to involve student teams in collecting and analyzing occultation data. The project is led by two planetary science researchers, one specializing on the outer solar system and the second focused on astronomy education and K-12 STEM teacher preparation. Additional information is available at www.tnorecon.net.

5 Case Western Reserve University

James Bader

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Additional authors: Kirsten Mahovich & Terri Lyles, Cleveland Metropolitan School District; Denny Taylor, Hiram College

District-University Partnerships Support Science Education in NE Ohio

The Cleveland Metropolitan School District science program integrates the contributions of local scientists into the district scope and sequence at an unprecedented scale. The CMSD program is a community-wide effort that takes advantage of the wealth of scientific expertise in northeast Ohio. During the Learn, Protect, and Stay program, each CMSD K-5 student visits local museums and nature centers. Each visit includes a teacher professional development session and in-class lessons and post-visit follow up lessons. Students interact with education staff and scientists while on site at each location and CWRU scientists provide a 21 day teacher PD program that complements the field experiences. *Igniting Streams of Learning in Science* was developed by Hiram College and defines a new role for high school teachers as observers of learning rather than deliverers of content. Scientists from Hiram, Akron, Kent State, and CWRU coordinate the work of college-aged near-peer mentors.

6 Center for STEM Education, Northeastern University

Christos Zahopoulos

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Retirees Enhancing STEM Classroom Education: Program Model & Going to Scale

The RE-SEED Program has been recruiting, training and placing retired science and engineering professionals as volunteers with K-12 classroom teachers since 1991. Retirees receive 32 hours of training which prepares them to effectively

support K-12 teachers and students, and are placed with a STEM classroom teacher. Over 750 trained volunteers have offered 800,000+ hours of service in 100+ school districts. After 24 years of refining the program model, RE-SEED is going to scale across the US, creating Regional Hubs in partnership with organizations that are well-staffed and connected with local school districts (i.e., higher ed, professional societies, national labs, etc.). At least two new Regional Hubs will be established per year, with each Hub reaching sustainability over a three-year period in collaboration with the Central RE-SEED Hub. The poster highlights the best practices of the program model and details the vision and process for scaling it nationally.

7 Christopher Newport University

Lisa Webb

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Additional authors: Michael D. Meyer, Roberto A. Flores, Geoffrey C. Klein, and Gary J. Whiting

Linking Water Quality with Science Education in Urban and Suburban Secondary Classrooms

The goals of our NSF-funded GK-12 project are to: (1) broaden the contextual framework of graduate fellows' research, (2) enhance the fellows' ability to effectively communicate scientific information to a non-scientific audience, (3) bring the excitement of doing science into the K-12 curriculum, and (4) allow K-12 students to utilize their findings to directly benefit their community and the environment. We developed an inquiry-based project that allows secondary level science teachers and their students to address critical ecological issues impacting the local Chesapeake Bay. Students design and build field gear, sample local ponds and lakes, and geospatially analyze and publish their data (using GIS and a web-linked database). Teachers are introduced to the project in a weeklong summer workshop. They are paired with their GK-12 Fellow early in the workshop and collaborate during the upcoming academic year to implement the project.

8 Florida Atlantic University GK-12

Vishala Maharaj

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Teacher Experience with the SQER³ Model for Classroom Demonstrations

Classroom demonstrations are useful in explaining concepts, yet due to their rigid structure and strategized outcomes, they leave very little room for direct student application of the practices of science (NGSS) to support their generation of testable questions. An ongoing challenge faced by science educators when utilizing classic demonstrations, is engaging students and allowing for direct involvement in the progression of the demonstration. This study shows the development of an interactive, question-driven framework for demonstrations that draws clear parallels to science practices and their implementation by high school chemistry teachers. By using this framework, defined as SQER³ (Survey, Question, Experiment, Recite, Reflect, and Review), teachers have taken common classroom chemistry labs such as the flame test and soda can density and have redesigned them into a cyclic questioning process that enables students to formulate questions and extend their investigations of concepts

9 Fountain Valley School District - Talbert Middle School

Sean Weiss & John Wood
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Building student engagement through collaborations and ROV's

Sean Weiss is an eighth grade student who has developed a deeper understanding and appreciation for the design and the use of Remotely Operated Vehicles (ROV) for the collection of data underwater. Through collaborations with local institutions, such as the Ocean Institute at Dana Point and the ExplorOcean facilities in Newport Beach, Sean has been working closely with staff members and researchers to better understand the processes of designing, testing, and using ROV's to accomplish tasks and gathering information for both commercial use and scientific research. His interests were inspired by Dr. Stacy Kim and her work with ROV's in Antarctica. She and her team use these instruments to collect, measure, and photograph under ice conditions and organisms. Sean will be on hand to showcase his learning and to share his experiences of working with engineers and researchers, as well as the process of sharing with fellow students at school and the Talbert STEAM Academy.

10 Fountain Valley School District - Talbert Middle School

John Wood
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Exploring Patterns of Soil Organic Matter Decomposition with Students

The Global Decomposition Project (GDP) is a program designed to introduce and educate students and the general public about soil organic matter and decomposition through a standardized protocol for collecting, reporting, and sharing data. This easy-to-use hands-on activity focuses on questions such as "How do environmental conditions control decomposition of organic matter in soil?" and "Why do some areas accumulate organic matter and others do not?." Soil organic matter is important to local ecosystems because it affects soil structure, regulates soil moisture and temperature, and provides energy and nutrients to soil organisms. It is also important globally because it stores a large amount of carbon, and when microbes "eat" or decompose organic matter they release greenhouse gasses such as carbon dioxide and methane into the atmosphere, which affects the earth's climate. The GDP provides a pathway for scientists and educators to interact and reach meaningful education goals.

11 Granada High School

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Antarctic Scientist-Teacher-Student Collaborations with ROVs

Remotely operated vehicles (ROVs) are used to explore the ecosystems under Antarctic ice sheets. Dr. Stacy Kim, Moss Landing Marine Laboratories, and her team, led teacher training to use ROV activities in science classrooms. Teams of middle school students integrated science with engineering to design, build, and test their own ROVs. Students followed Kim's team in Antarctica by reading and commenting on the project's blog. Also, students designed housing for GPS trackers worn by researchers in Antarctica, then monitored scientists' movements on the ice. Students were highly engaged as they connected with scientists, reviewed authentic science data, explored STEM careers, and participated in a challenging but rewarding engineering design project. This project connects students with many facets of STEM learning, including engineering, electronics, ecology,

climate science, and biology, and brings field science into classrooms.

12 Health Sciences and Technology Academy/National Institute for Occupational Safety and Health

Summer Kuhn

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Additional authors: Tara Hartley, Margaret Kitt

Pilot mentor research partnership: NIOSH researchers and HSTA high school students

The Health Sciences and Technology Academy (HSTA) encourages rural West Virginia high school students to partake in community research projects. Goals of the research experience are to create opportunities for students and teachers to work alongside researchers on community projects and to build and maintain mentor/mentee relationships. A new partnership between HSTA and the National Institute for Occupational Safety and Health (NIOSH) will be discussed, including partnership initiation, the status of mentor/mentee relationships, and methods for partnership sustainability.

13 Iowa State University

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Additional author: Daniel Garrick

Teaching Engineering Principles Using DAVinCI Flight

As the middle school curriculum moves towards the incorporation of multiple STEM concepts, there is a need for hands-on platforms to demonstrate how these concepts are integrated and used in the real world. A new software package, DAVinCI Flight developed by VSI Aerospace Inc., offers such a multifaceted platform by allowing for the design and simulation of gliders. Within this simulation environment, students are confronted with core math and science concepts that they analyze to improve and test the design of their virtual gliders. Ultimately, through hands-on experiences, the students learn how engineering design proceeds. This poster examines the utility of this software in 8th grade science classes and possible future implications.

14 Iowa State University Research Institute for Studies in Education

Vincent Genareo

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Additional authors: Mari Kemis, Adah Leshem

What does an engineer do? Student conceptual change from GK12 participation

This poster describes methods and results of analyses of four years worth of middle school pre- and post-survey items (N=1853) of students paired with a GK12 scientist who taught their class once a week. The survey items included an open-ended response asking students to write what they believed an engineer does. Students made statistically significant conceptual gains ($p < .001$) each year. Further, their analyses were coded and analyzed to determine how students perceived genders of engineers, and the types of work they believed engineers do. Additionally, five items asked students to rate their level of engagement with their GK12 scientist. The higher they rated each of these items, the more they grew in their understanding of engineering, an unforeseen effect highlighting the importance of meaningful student-scientist interaction. The poster includes implications of student engagement in teacher-scientist partnerships, particularly in relation to how students view STEM fields.

15 Iowa State University Research Institute for Studies in Education

Vincent Genareo

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Additional author: Stephanie Zywicki

Teacher-Scientist Partnerships: A Professional Development Model

This poster highlights the results from a qualitative research study conducted with nine teachers who participated in a program that paired middle and high school science teachers with graduate student scientists, with the goal of collaboratively designing science curricula that would increase student interest and engagement in STEM-related concepts. One unanticipated outcome of the teacher-scientist partnerships was the influence of the relationship between teacher and scientist on teachers' sense of professional identity and on their professional development. This poster discusses the ways teachers found their relationships with the scientists beneficial and how this informed or changed their

practice of teaching science. This poster also brings forth important considerations school districts might think about when creating and implementing professional development opportunities for teachers at all science levels.

16 Kansas State University

Teresa M. Woods

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Additional authors: Carolyn J. Ferguson, Timothy Bolton, Kelly Morgan Dempewolf, Eric A. Maatta, N. Sanjay Rebello, Jacqueline D. Spears, Scott Tanona, and Rebecca Steiger.

GK-12 Showcase: Celebrating the Impact and Future of the EIDRoP Initiative

Scientists are sometimes challenged in communicating with general audiences due to public misconceptions regarding the types of evidence accepted within scientific disciplines as well as the manner in which scientists move from evidence to inference. Understanding how available data can inform us of objects or events that we cannot directly experience or manipulate (e.g., evolution, climate change, modeling) is particularly challenging. Moreover, scientists are not always cognizant of assumptions they make and their processes in moving from evidence to inferences. Evidence-based inquiry into the distant, remote, or past (EIDRoP) serves as a unifying theme for professional development activities for our GK-12 program. The project involves partnerships between Kansas State University STEM departments, the College of Education, the Department of Philosophy, and a public school district (USD 475, Geary Co., KS). As the program concludes its sixth year, we showcase our gains, including graduate fellows' greater recognition of scientific assumptions and processes, improved understanding of the background and values others bring to the learning of science, and better communication skills regarding science. We explore future directions in leveraging the partnership infrastructure for broader impacts for faculty research, and improving science education at K-12 as well as college levels.

17 Life Sciences Outreach at Harvard University, FAS

Tara Bennett Bristow

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Life Sciences Outreach at Harvard University

The Life Sciences Outreach Program at Harvard University is committed to enhancing high school biology education in New England through professional development programs for teachers and hands-on laboratory experiences for students. Through our fall faculty lecture series, teachers learn about current research, and in follow-up programs they use these concepts to develop novel curricular materials. We recently piloted a program in which teachers are creating iPad-based activities that allow students to analyze authentic datasets. Each spring, teachers bring their students to on-campus laboratory sessions to explore topics ranging from zebrafish embryology to plant physiology. Students also explore biotechnology in their own classrooms through our Amgen Biotech Experience program. In the period stretching from 2002-2014, we have provided science outreach to over 20,000 students and 400 teachers with the help of over 50 faculty members and 150 graduate students and postdoctoral fellows.

18 Louisiana State University Health Sciences

Center Shreveport

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Additional author: Megan Moore

BIOSTART: Research Intensive Internship and Education Experience for High School Students

Enhancing student interest in biomedical science careers, particularly in the traditionally under-served population, has been an important goal of many STEM programs. LSU Health Sciences Center in Shreveport (LSUHSC-S) is a research-intensive biomedical science center in northwest Louisiana which has a large under-served population. A collaboration was established in the mid-2000s among Caddo Parish School Board, LSUHSC-S and the Biomedical Research Foundation to create a program to stimulate biomedical science interest in such students. The BioTechnology Academy was established at Southwood High School, which has a large rural, minority and first-generation-college population. This program features a four year biomedical intensive curriculum for the select population in the academy. In the fall semester of the 4th year, Academy students spend half of the school day for 18 weeks participating in a research internship program (BioStart), in which they work

in the laboratory of a designated LSUHSC-S faculty mentor on a research project. BioStart students also receive instruction and training in laboratory and radiation safety, animal handling, and ethics, in a career enrichment series, in a university-wide poster session and in various regional or national science competitions. Students also participate in outreach activities at the local science museum to inform middle school students about science activities and hopefully recruit students into the BioTechnology Academy. External evaluation has shown that BioStart participants, when compared to students at two control high schools with similar socioeconomic status, have a higher percent college enrollment, more often major in science in college, and are more oriented towards a life science career. This research intensive program for high school students appears to have begun to achieve the goals set forth of increasing college enrollment particularly in science careers. Efforts are underway to expand the program across the northwest Louisiana region.

19 McDowell High School

Christopher Midden
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Additional authors: Travis Neal

Robert E. Noyce Master Teacher Fellowship Bringing Science to the Classroom

20 Master Teacher Fellows through support from the NSF partner with SIUC research scientists to investigate real local problems in southern Illinois. Students are brought in as active participants in this research to collect and analyze data as well as develop meaningful and real solutions to local problems. This partnership inspires students and teachers as well as makes them active partners in real and meaningful scientific research.

20 Middle Tennessee State University

Karen Case
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Additional authors: Kim Sadler

FOSTERING INTERNATIONAL RELATIONSHIPS THROUGH SCIENCE TEACHING IN CHILE

The MTSU NSF GK-12 program partners Biology graduate students and high school teachers with biotechnology companies to promote STEM learning opportunities. Graduate Fellows spend

one to two years in high school biology classrooms as visiting scientists facilitating learning and mentoring student research projects. The school year culminates with student research presentations at the Tennessee Junior Academy of Science or our GK-12 TRIAD Research Symposium. To make global connections through our GK-12 project, we fostered relationships with scientists at the Universidad de Chile, Departamento de Biología in Santiago who work with Chilean biotechnology companies and Chilean high schools. In August 2013, and May 2014, our team visited Chile to work in research labs and teach lessons in high schools. Despite having limited materials, and needing translators, engaging and challenging lessons were conducted resulting in Chilean students' eager participation and meaningful inquisitions.

21 Middle Tennessee State University

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Additional authors: Karen Case, Heather Corban & Pamela Stewart

TEACHING, RESEARCH, AND INDUSTRY PARTNERSHIPS IN MIDDLE TENNESSEE

The Middle Tennessee State University National Science Foundation GK-12 program is focused on Teaching, Research, and Industrial Applications to Deepen (TRIAD) scientific understanding in Middle Tennessee. Graduate students in biology, high school science teachers, and biotechnology companies partner together for a calendar school year to bring effective teaching and research to the classroom. An interactive two-week summer workshop introduces Fellows and teachers to the program. Visits to participating Industry Partners allow student-teacher pairs the opportunity to meet and interview local biotech industry scientists. During the year, the science companies are invited to high school classrooms where they share with students their specific technologies and educate high school students about possible careers in science. Partner Teachers also spend part of the summer week in the lab with their Graduate Fellows and conduct a research project. Each Fellow incorporates his/her research into the high school classroom by serving as a Scientist-in-Residence and presenting introductory lessons and lab activities. Graduate fellows mentor high school student research projects and utilize their connections with Industry Partners

to form research mentor connections between students and the community. With a diverse group of Graduate Fellows, unique connections with community Industry Partners, and a variety of urban and suburban teachers and high schools, the TRIAD GK-12 program represents a model of an exciting project aimed at integrating teaching, research, and industrial applications.

22 Morehouse College

Cynthia Trawick

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MOREHOUSE COLLEGE PRE-SERVICE STEM TEACHER INITIATIVE DREAMS TO TEACH

Morehouse College Pre-Service STEM initiative prepares African American (AA) males for STEM teaching careers through a collaborative effort between Morehouse College STEM faculty, Teacher Preparation Program and the Atlanta Public Schools. The DREAMS to Teach (DRK-12) program recruited high school juniors, prepared them for college success, and provided rigorous academic advisement and mentoring during their college matriculation. These students are currently Freshmen and Sophomores at Morehouse College in the STEM Teacher Preparation Program funded through the DRK12 grant. Juniors and Seniors in the STEM teacher preparation program are funded by a Noyce grant. This synergy between DRK-12 and Noyce has resulted in a program which ensures success of students matriculating to create a pipeline in which 6th-12th grade STEM educators are fully engaged. This model for training STEM teachers is predicted to have a significant impact on the number of AA males in STEM teaching careers.

23 NOAA Teacher at Sea Program

Jennifer Hammond

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NOAA Teacher at Sea Program: 25 Years of Research Experiences for Teachers

In 2015, NOAA's Teacher at Sea Program celebrates its 25th year of providing authentic research experiences to kindergarten through college level teachers from around the U.S. aboard NOAA ships conducting scientific research. This successful communication of NOAA science is built on the close partnership with the teachers and NOAA scientists. Since 1990, over 700 teachers from around the

country performed close to 100,000 hours of research at sea, and program alumni from every state use NOAA science and data in the classroom, reaching thousands of students. Recently, the program also enhanced its alumni association activities and science communications efforts through the use of creative online technology and engaging teacher-created educational products. This poster will help explain more about the outcomes of this program and how to access its online educational products.

24 Penn State Center for Science and the Schools

Leah Bug

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Additional authors: Annmarie Ward & Matthew Johnson

Enhancing scientists' skills for providing standards-based K-8 teacher PD

Current national science teaching standards require teachers to incorporate the discourse and practices of science and engineering into their classroom teaching. These expectations present challenges for both teacher preparation and teacher professional development programs working with elementary teachers and middle school teachers who were prepared as generalists, with only limited coursework or experience with science research. Furthermore, while being experts in research practices in particular STEM fields, many researchers have difficulty translating that knowledge and experience to teachers in ways that are transferable to the K-8 teaching context. At the Center for Science and the Schools (CSATS) at Penn State, we have been addressing these challenges through a teacher professional development program for K-8 teachers called Saturday Science Workshops, a series of 5-7 one-day workshops offered over the course of each academic year. We have worked collaboratively with STEM researchers to design professional development that teaches curriculum relevant content knowledge at a level accessible to generalist educators using activities that are adaptable for K-8 classrooms and model education research-based inquiry-based methods that incorporate the practices of science and engineering. Our poster will present the collaborative process we use for working with researchers during development and implementation of the workshops to help them 1) better understand inquiry-based teaching practices

2) design and implement inquiry-based lessons that are adaptable to K-8 classrooms, and 3) develop skills for communicating with non-technical audiences.

25 San Joaquin County Office of Education

Nancy Stenzler
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Teaching Opportunities for Partners in Science: 21 Years Strong

Teaching Opportunities for Partners in Science (TOPS) is a comprehensive volunteer partnership program that helps schools tap into the tremendous talent that exists in their community among retired scientists and engineers. The TOPS program combines the knowledge and skills of the classroom teachers with the content knowledge of the science and engineer volunteers. TOPS began in 1993 as a pilot program in San Joaquin Stanislaus, and Tuolumne counties in California. The goal of the initial pilot program was to determine if placing retired scientists in a school setting made a significant difference in the schools science program. The pilot showed that retired scientists and engineers were a great asset to a school. Today, the TOPS program is active and flourishing in San Joaquin, Alameda and Tuolumne counties and is expanding into Santa Clara, Amador, and Calaveras.

26 Southern Illinois University

Sedonia Sipes
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Problem-Based Learning Using Pollen Analysis

Our NSF-funded Robert Noyce Fellowship program entitled "A Community of Problem Solvers: Teachers Leading Problem-Based Learning in Illinois," is training Master Teaching Fellows (MTFs) to lead pre- and in-service teachers in our community towards implementation of inquiry-based learning. Our program strives to transform the way science is taught in Southern Illinois by utilizing place-based exercises, which we refer to as "backyard science." In the effort, teachers in elementary, middle and high schools collaborate with researchers from Southern Illinois University-Carbondale. Towards these goals, we have developed a pollination ecology project that builds STEM knowledge and skills across several disciplines. Pollen analysis of bee scopal loads allows teacher and student researchers to address a wide

variety of questions about ecology, plant-pollinator interactions, plant biology, and animal behavior.

27 Stanford Graduate School of Education (Learning, Design and Technology Program)

Jessica Huang
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Teacher-engineer collaborations on hands-on STEM lessons in Ghana & Uganda

This poster will cover examples of collaborations between teachers and engineers on providing hands-on STEM (Science, Technology, Engineering, Math) learning opportunities to primary and secondary school-age youth in New Longoro, Ghana and Kabarole, Uganda. These teacher-engineer collaborations received extensive support from partnerships with universities and non-governmental organizations, and contributed to experiential learning programs in- as well as out-of-school. Key themes from the example case studies include: 1) finding ways for teachers and engineers from different geographies to set aside time to collaborate, and 2) using locally-available materials available from nearby markets, waste dumps, and natural resources.

28 The New York Academy of Sciences

Kristian Breton
kbreton@nyas.org

NYAS and SUNY Scale Up

This poster provides information regarding the rationale, challenges, and benefits of combining the resources of SUNY and the Academy to provide under-served youth with high-quality STEM mentors.

29 University of North Carolina, Greensboro-GK-12

Kristy King
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From Eww to Ooh: Connecting Scientific Concepts Using Bats

Bats provide a unique teaching opportunity for connecting concepts covered in elementary through high school science curricula. Through the GK-12 program at UNCG, teachers work with graduate students, or resident scientists, to enhance the

required science curriculum in 3rd grade, 8th grade science, and high school Biology and Honors Anatomy and Physiology classes. For Disease and Ecology units, rabies and White-nose Syndrome were investigated and the students were introduced to “soundscape ecology”. Bats were also used for comparative anatomy and morphology. An ultrasound bat detector was used to monitor changes in bat populations and community at the high school. As a possible outcome from this partnership, 8th grade End-of-Grade science scores increased from 45% to 65% proficiency. By using one organism to connect science units, students are able to develop a deeper understanding of and continuously review science concepts. Additionally, most of these students no longer fear bats!

30 University of Alaska Fairbanks

Laura Conner
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A teaching and outreach certificate program for science graduate students

Despite the multifaceted nature of responsibilities that scientists will have in their careers, most graduate programs in the sciences have not traditionally offered explicit training in teaching and learning. Programs such as GK-12, which partner science graduate students with teachers, offer this type of professional development to students, but such programs are often contingent upon external funding. The University of Alaska Fairbanks recently launched a graduate certificate program in science teaching and outreach as a mechanism to institutionalize teacher-scientist partnerships and sustain this mechanism of professional development over the long term. Graduate students take 12 course credits, including 4 credits of internship that place graduate students in K-12, higher education, or informal learning contexts to practice science teaching and communication skills. Here, we present our model, including the certificate development process and initial program outcomes.

31 University of Alaska Fairbanks

Janice Dawe
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Zachary Meyers, Joan Parker-Webster, Chris Pastro

A Day in the Life of the Fairbanks STEAM Institute:

A Botanical Immersion Through Multiple Lenses

This poster will present a day in the life of the Fairbanks STEAM (Science, Technology, Engineering, Arts, Math) Institute: A Botanical Immersion Through Multiple Lenses. The organization of the instruction and activities of the Institute mirrors a systems approach to teaching and learning. The Institute brought together a dedicated faculty with diverse STEAM expertise and diverse participants, including 19 K-12 educators from across Alaska, six University of Alaska Fairbanks (under)graduate students and one UAF professor. Participants chose a forest plot for study and kept careful daily observations in a Grinnell System of Nature Journaling notebook, with areas for data collection, sketches, photos, maps, and reflective writing based on a thematic word of the day. They spent several hours each day in the art studio and brought this work together with their fieldwork to produce a botanical plate. They worked on this image daily, and created an engineered paper portfolio to hold the full set of reproduced plates. Each participant also developed a creative essay inspired by his or her field plot and based on readings from *The Forest Unseen* by David George Haskell. They were introduced to the technological tool of augmented reality to produce an audio overlay for their plates. In the afternoon teacher’s forum, each K-12 teacher created a STEAM lesson plan for the 2014-15 school year, in subjects ranging from astronomy to chemistry, music composition to plant and insect phenology. They also took part in focus group discussions to document their new understandings of the STEAM approach.

32 University of California, San Francisco

Charles Morgan
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Becky Fulop, Ben Koo, Norma Velazquez Ulloa

What Can Topsy Fruit Flies Teach High School Students?

We share a lesson centered on utilizing fruit flies to explore several aspects of biology, including genetics, animal behavior, drug addiction, and the advantage of using model organisms. The utilization of *Drosophila Melanogaster* provided a unique opportunity for high school students to gain hands-on experience with cutting edge science, provided a mechanism to quickly engage a diverse student population with varying degrees of comfort in “doing science”, and gave scientists an avenue to

communicate the significance of their own research with students. Students quickly became scientists, practicing their observation skills, utilizing scientific literature to gain background knowledge, using their own curiosity to develop original research questions and hypotheses, practiced scientific communication by creating a mini-poster, and gave feedback on the research of their peers. In addition, the organization of the teacher-scientist partnership and effective strategies used during lesson planning will be discussed. Lesson resources used in the classroom will be made available.

33 University of California, San Francisco

Sabine Jeske, Jennifer Kaelin, Ben Koo, Jean MacCormack, Lakisha Witzel

The Science and Health Education Partnership: Supporting Science Teaching and Learning

The Science and Health Education Partnership (SEP) at the University of California, San Francisco (UCSF) promotes science education through partnerships between scientists and educators. With a mission to support high quality science education for K-12 students and over 25 years of experience bridging the culture of science and education, SEP implements programs that promote teaching and learning among scientists, teachers and students. Classroom partnerships range from short-term semester-long to more intensive, year-long programs. Scientist volunteers have the opportunity to mentor a high school student during a summer research program. Additionally, SEP offers professional development for teachers through week-long intensive content courses during the summer. SEP further supports hands-on science teaching by providing material resources through SEP's lending library, the Daly Ralston Resource Center (DRRC). The DRRC houses over 3000 items and is used by nearly 400 teachers and scientists per year, with materials reaching over 20% of San Francisco Unified School District students. In total, each year over 300 teachers benefit from SEP and programs take place in 90% of San Francisco's 120 public schools.

34 University of Connecticut

Stephanie Bendtsen
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University of Connecticut's GK-12 Program Rube Goldberg Competition

The University of Connecticut's NSF Graduate STEM Fellows in K-12 Education (GK-12) Program has partnered with technical high schools across the state to participate in the National Rube Goldberg competition for the past several years. Each GK-12 Fellow works with a team of technical high school students to create a Rube Goldberg machine and compete in a regional competition. The goal of the competition is to construct a "complex-simple" machine capable of completing a simple task as a result of a succession of at least 20 steps. The students learn the steps of the engineering design process and with guidance from the GK-12 Fellows, each team spends sufficient time brainstorming, designing, building, testing and modifying their machines. The students learn the importance of teamwork and explore their creative sides while having fun. This poster will focus on the mentorship involved in effectively fostering an environment that gets students excited about the engineering design process.

35 University of Connecticut/GK-12 Program

Tulsi Patel
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Bridge from Technical High School to Higher Education in the STEM Field

The GK-12 program, funded by the National Science Foundation, allows STEM graduate students at the University of Connecticut to visit technical high schools around the state. The goal of this program is for graduate students to gain teaching experience while encouraging high school students to pursue degrees in the STEM field. The teaching model is heavily based on hands-on engineering activities. Graduate students engage and excite students through both in-class demonstrations and long-term projects such as Rube Goldberg, Moon Buggy, and a design competition. This type of model involves partnership between the graduate students from the university and the teachers and students from the high school. Moreover, various workshops with the teachers and graduate students will permit better communication for the enhancement of students.

36 University of Florida

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International Research Experiences: Fossils and Paleontology in Panama

Panama is central to documenting New World Tropical biodiversity over the past 25 million years, including the Great American Biotic Interchange. We have developed a scientist-teacher partnership doing paleontological field research in Panama. This annual program includes PD with: (1) a pre-trip orientation in May; (2) two weeks of field work in Panama in July; and (3) a post-trip online community and December wrap-up session. Scientists and 25 teachers from CA, FL, and NM have collaborated so far; two additional cohorts are planned for 2015 and 2016. Deliverables include research products (meeting presentations and published papers) and lesson plans aligned with new learning standards. Outcomes include increased: (1) appreciation of scientist-teacher collaborations; and (2) knowledge of paleontology and related subjects (e.g., biology and geology). International field work like this provides multicultural authentic research experiences not typically available by other PD models.

37 University of Florida Center for Precollegiate Education and Training

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UF CPET: Professional Development Programs for Science Teachers

The Center for Precollegiate Education and Training (UF CPET) promotes and supports the use of the facilities and faculty of the research university in the preparation and enhancement of science and technology teaching at the secondary education level. As the University of Florida “umbrella” for the articulation and transfer of science and technology to public school and community college teachers, students and the public-at-large, UF CPET combines many outreach activities, providing access to university research disciplines/faculty and fostering life-long relationships between researchers, teachers and students. UF CPET science education programs enable individualized and team-centered direct, and ultimately pervasive, public dissemination of research and knowledge through enhanced teaching.

38 University of Maine, Orono

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Additional authors: Clint Eaton, Stephanie Virgilio, Mitchell R. M. Bruce , Laura A.Millay

Teacher growth during chemistry professional development and middle school student learning of chemistry content through innovative science partnership in the MainePSP

Maine Physical Sciences Partnership (Maine PSP) is a National Science Foundation project led by the RiSE (Research in STEM Education) Center at University of Maine to reform and vertically align science education in rural school districts. This poster highlights Maine PSP contributions towards professional development (PD) of chemistry teachers and gains in students’ science understanding. A task force of science educators and teachers used AAAS criteria to evaluate multiple sets of materials and chose the SEPUP (Science Education for Public Understanding Program) Chemistry curriculum to be implemented by more than 30 8th grade teachers across the state. Over the past five years, the partnership has evolved in response to the needs of the teaching community by providing PD on topics of interest/need to the teachers resulting in a unique level of teacher ownership in their own development as leaders and professional educators. This poster presents data from an intensive weeklong summer professional development experience and follow-up interviews showing that teachers improved their content knowledge and pedagogical skills for teaching chemistry. These gains were evident from data sources collected prior, during, and at the end of the PD workshop. For example, teachers showed growth in content and instructional strategies in the posters they created as part of their workshop activity. This poster also presents two years of survey data which show gains in students’ understanding of science concepts - in particular, we see strong learning gains within the topic of conservation of mass, as compared to national data from AAAS.

39 University of Minnesota

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Scientist and Teachers InSciEd Out: A Model for Novel Partnering

Integrated Science Education Outreach (InSciEd Out), a shared program between Rochester, Minnesota public schools and the Mayo Clinic, has shown dramatic improvements in student learning. Recently, InSciEd Out has expanded to the University of Minnesota and K-12 public schools in the Twin Cities. Within InSciEd Out, teachers participate in a 12-day professional development program providing pedagogy training and authentic research opportunities. Following the internship, teaching teams develop novel curricula and identify opportunities for scientist and resource support. To date, over 40 teachers in West Saint Paul have participated in the training and are now testing initial modules. Additional baseline measures are currently being gathered. InSciEd Out represents a successful partnership model teaming community members, local schools, and research centers to improve scientist and teacher interactions, and to ultimately improve student scientific engagement and proficiency.

40 University of North Carolina Greensboro

Stacy Curry
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University of North Carolina Greensboro (UNCG) GK-12 Program 2014-2015

The GK-12 program at UNCG has been funded by the National Science Foundation to partner graduate student fellows from three departmental graduate programs (Biology, Chemistry and Biochemistry, and Geography) with teachers and students at three Guilford County Schools. Fellows, teachers and students form partnerships to scientifically investigate the biological, chemical, physical, health-related, and socioeconomic effects of changing land use patterns in the region. Teachers and fellows work towards three primary goals: the development and delivery of inquiry-based lesson plans, the greater quality and quantity of differentiated instruction, and the creation of school-based teams to teach others science concepts and methods. The poster includes descriptions of specific resident scientist and lead teacher partnerships.

41 University of Pittsburgh

Robert Branch
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An Experiential Model: Health Science Clubs for Minority, Urban Youth

The Pitt-Bridge Program provides a learning opportunity to underserved students in health science. Using experiential learning, students faced with adversity learn to understand and comprehend alternative options and make meaningful decisions to enhance their "Sense of Coherence" (SOC). Health clubs designed as "intentionally intelligent learning groups" (small size, safety, structure and sustainability), engage in micro-Community-Based Participatory Research (mCBPR) on self-selected, relevant community health problems. Students invest 75 hours towards their health project, involving their family and neighborhood. A tiered model of diffusion learning extends from University faculty through knowledge brokers, to club mentors, to students and their families. The process of mCBPR integrates STEM concepts and practices of how to "learn, decide and change behavior", skills that enhance SOC, lead to success in college and decrease health disparities in their communities.

42 University of Puerto Rico at Cayey

Edwin Vazquez
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Incorporation of Scientific Research into a Teacher Preparation Program

We are providing research experiences for pre-service teachers as part of our teacher preparation program. Students participate in a year-long project on microbial ecology, followed by a summer academy with in-service teachers. They are capacitated to transfer their knowledge to pre-college students through a pre-practicum pedagogy course. Teaching units have been developed about major concepts in microbial ecology, especially on soil bacteriophages and bacteria, which are being implemented in the schools. As part of our assessment, we include pre and post-tests, oral presentations, written reports, digital portfolios, laboratory notebooks, focus groups and self-evaluation questionnaires. Our data indicates that the research experiences have positively impacted all participants' attitudes toward science and the scientific process, and promote a

deeper understanding of the scientific concepts involved. Supported by grant #52007565 from the Howard Hughes Medical Institute.

43 University of Southern Mississippi

Kristina Pierce
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Improving GK-12 Fellows' Communication Skills to Diverse Audiences

The goal of the GK12 program is to develop fellows' communication skills and ability to relate research advances in a way that is understandable to broad audiences. To that end, a series of training and development initiatives were implemented throughout a student's fellowship. In the spring semester prior to the acceptance of fellows, students attend a two-session training workshop with the University Speaking center targeted at fundamentals of presentation development. During the summer workshop, fellows prepare a short presentation describing their research for a general audience of teachers, graduate students, and USM faculty from different scientific disciplines. Fellows also present lesson plans, research updates in addition to implementing lessons and providing presentations in the classroom as well as presenting scientific conferences. Each of these experiences is designed to improve fellows' abilities to effectively communicate effectively to broad audiences.

44 University of Texas

Greg Clark
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Middle school programs: Shadow a scientist and Present your Ph.D. thesis

"Shadow a Scientist" and "Present your PhD thesis to a 12-year-old" are novel science education programs designed to promote interaction between the scientific research community at The University of Texas at Austin and middle school students in the surrounding area. Both of these programs provide opportunities for professional development of graduate students and faculty aimed at improving their science communication skills. "Shadow a Scientist" is a summer program in which scientists host a pair of middle school students in their laboratory. "Present your Ph.D. to a 12-year-old" is a program in which graduate students present

a simplified version of their Ph.D. thesis in middle school classrooms. These programs give scientists the opportunity to communicate their discoveries with students and encourage the students' curiosity and enthusiasm for science. We will present details about both programs including results of surveys used to assess their effectiveness.

45 University of Virginia

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Additional authors: Joanna Corby - University of Virginia; Catherine Grebe, David Hatter, Do Yeop Kim & Brendan Ventura - Albemarle High School

Distribution of Stellar Population in NGC 1097 by Age-dating Star Clusters

As part of the GSTAR collaboration including high school students, graduate mentors and science principal investigators, we present preliminary analysis of optical data of the nearby galaxy NGC 1097. This galaxy presents a wide range of environments - including a circumnuclear ring, a strong bar and spiral arms - making it ideal for studying the distribution of star cluster populations as a function of environment. We identify different star cluster populations by age dating them. We do so by analyzing high-resolution images from Hubble Space Telescope bands U, B, V, I and H α filter of NGC 1097. We identify star clusters in different environments, obtain their colors and place them in a color-color diagram. This is compared to stellar population models which allow us to estimate the age of these clusters. We present the corresponding color-color diagrams and the star cluster population distribution throughout the different physical conditions of the interstellar medium in NGC 1097.

46 University of Wisconsin-Madison

Kevin Niemi
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The National Alliance for Broader Impacts

All NSF grants are reviewed on two criteria: Intellectual Merit and Broader Impact. NSF and its oversight body, the National Science Board, are firmly committed to both criteria. The definition of Broader Impact however is less clear to the science community than is Intellectual Merit. The goal of the National Alliance for Broader Impacts (NABI) is to create a community

of practice that fosters the development of sustainable and scalable institutional capacity and engagement in Broader Impact (BI) activities. The NABI efforts to establish a community of BI practitioners is funded in part with a Research Coordination Network grant from NSF, #1408736. This poster will highlight the efforts of NABI and the resources available through NABI.

47 Van Andel Education Institute

Marty Coon

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VAEI Summer Research for Teachers Program

The Van Andel Education Institute's (VAEI) Summer Research for Teachers program focuses on helping teachers translate their research experience into improved classroom teaching and learning practices. VAEI has developed tools that support teachers as they work to implement new knowledge and skill in their classrooms. Teachers spend one day per week of the eight week summer research experience engaged in group professional development activities. These activities include training in inquiry-based pedagogical practices, studying educational research articles, journal writing, and curriculum development. Teachers also meet one evening per month throughout the school year to talk about their implementation successes and challenges. Science Education Specialists visit teacher classrooms throughout the school year to provide classroom level support. These coaching sessions has proven to be a valuable support mechanism to help bring about improved classroom teaching.

Lesson Expo

February 11th, 3:30-5:00pm

Summaries: Organized alphabetically by institution or project. Email contacts are provided

A Baylor College of Medicine

Nancy Moreno
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BioEd Online

Hundreds of lessons for all grade levels are available free-of-charge on BioEd Online--Baylor College of Medicine's award-winning science education website. Learn more about the up-to-date teaching resources in areas such as genetics, neuroscience, space science, infectious diseases and STEM integration. Many lessons are accompanied by video, slides or student reading materials. Development of materials on BioEd Online has been funded by the National Institutes of Health, National Science Foundation, NASA and others.

Keywords: Online resource, Lesson plans, K-12, General science, Biology, Videos

B Colfax-Mingo High School

Laurie McGhee
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iTAG Barley: A 9-12 Curriculum to Explore Inheritance of Traits and Genes

The 'Inheritance of Traits and Genes in Barley' Project is a module of laboratory and classroom activities designed to help students make connections between genotype and phenotype created by science teachers and researchers at Iowa State University. Attendees will get the opportunity to explore the lessons and gain insights into how to implement them to fit their particular curricular needs. Attendees will also get the opportunity to experience using some of the biotechnology equipment by performing the Micropipettor Practice and Gel Electrophoresis Lessons.

Keywords: Genetics, DNA, Biotechnology, Plants, Biology, 9-College

C Iowa State University

Kristi Korkowski
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Additional presenters: Kristi Korkowski - Iowa State University Department of Mechanical Engineering, Anna Lund - Brody Middle School

Physics Concepts of Objects in Motion

Two lab activities focusing on general physics principles including; forces, motion, gravity, acceleration and momentum allow students to get actively involved in their own learning. Each of the activities are designed to include hands on experiments, relevant calculations and graphing activities to engage both visual and kinesthetic learners. Discussion during the activities included experiment explanation, hypothesis development, observations and result correlation. Using this data they can predict behavior of objects which experience similar forces or acceleration.

Keywords: Acceleration, Momentum, Middle School, Forces, Gravity

D Mission San Jose High School

Katy Kuei
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Chemistry Challenge

Bring some competition back into the classrooms with chemistry challenges. Five hands-on activities include colorful innovative design, exploration, gas law, math calculation, stoichiometry, team work and phase change. Check out how to modify, set up and run a successful challenge that can excite and motivate the students. Students love these challenges. They participate with high spirit and achieve better learning outcomes. Come and see the elephant, liquid dry ice, rainbow, iron chef, and mini rocket challenges. These challenges will surely rock and enrich any curriculum.

Keywords: Physical Science, Chemistry, 9-12, Inquiry, Competition, Exploration, Motivation, Hands-on Activity

E NSF Robert Noyce Master Teacher Fellow Program

Travis Neal
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Additional presenters: Travis Neal - Southern Illinois University graduate student, Noyce Program, Julie Wittenborn-Sikorski - Murphysboro Middle School, Noyce Program

Place Based Learning: Pollination Biology in the Classroom

Teachers and researchers in Southern Illinois are transforming the way science is taught by conducting place-based exercises in local and schoolyard habitats. Our pollination ecology project is ideal for such implementation. We will present place-based inquiry exercises on pollination biology that enrich content knowledge and research skills of teachers and students. The focus of the Community of Problem Solvers was to incorporate sciences different means from conventional teaching methods. Students can identify or have a “sense of place” when working within the community.

Keywords: Elementary School, Ecology, Plant Biology

F Truro Central School & NOAA Teacher at Sea

Stacey Klimkosky

klimkoskys@truromass.org

Additional presenters: Grace Simpkins - NOAA Northeast Fisheries Science Center

NOAA Scientists and Teachers: A Match Made at Sea

We will demonstrate a variety of lessons based on the research done at NOAA’s Northeast Fisheries Science Center. Learn how to use a marine mammal dichotomous key to identify marine mammals and tailor it to your region. Participate in right whale and humpback identification using aerial or shipboard images and images of known whales. Familiarize yourself with various marine mammal sounds and then identify mystery sounds. Discover how student/teacher built ocean drifters can be deployed and how the data can be used in classroom activities.

Keywords: Marine Science, Marine Mammals, Oceanography, Acoustics, K-6, Drifters, North Atlantic Right Whale, Humpback Whale

G UC Santa Cruz/SCWIBLES

Elissa Olimpi

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Additional presenters: Caleb Bryce, Jeff Jenkins, Vikram Baliga, L. Maxine Tarjan, Kristin De Nesnera

Inquiry Modules Developed through Teacher-Scientist Collaboration

We invite you to participate in three interactive,

classroom-tested science learning modules covering the mammalian dive response, urban walkability, and trends in the periodic table. With short demos, conference attendees will be equipped with the experience and resources to try each in their own classes. These and many other inquiry modules were developed through a joint partnership of Watsonville High School science teachers and practicing research scientists at UC Santa Cruz.

Keywords: Hands-on, Interactive, Atomic Trends, Dive Response, Walkability, Social Science, Anatomy and Physiology, Chemistry, Biology, Urban Planning, Middle School, High School, NGSS

H University of Connecticut

David Gamliel

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Additional presenters: David Gamliel, Jeremy Stromer, Stephany Santos, Michael Zilm, Tulsi Patel, Sharon Scott, Aida Ghiaei

Balloon or Bust: Visualizing Greenhouse Gas and Engineering Solutions

This hands-on session is designed to expose educators to a brief lesson plan for teaching about global warming, greenhouse gas and alternative energy. Participants will learn about the origins and impacts of greenhouse gas and about some of the available technologies to reduce emissions. Key scientific concepts include: ideal gasses, dimensional analysis, and order of magnitude. Program will be led by the UConn GK-12 fellows with cooperation from the UConn Center for Clean Energy Engineering.

Keywords: Energy, Climate Change, Greenhouse Gas, Engineering, Chemistry, Physics, 9-12

I University of Florida Center for Precollegiate Education and Training and School of Teaching and Learning

Julie Bokor

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Additional presenters: Jennifer Broo - St. Ursula Academy, Bruce MacFadden - Florida Museum of Natural History, Cheryl McLaughlin - Florida Museum of Natural History, Sean Moran - Florida Museum of Natural History

Bringing Natural History Collections into the Science Classroom

Natural history collections hold a rich resource for teaching science concepts. To unlock the potential of collections in precollege classrooms, teachers and scientists joined forces to create an engaging series of lessons to assist with the instruction of evolution. In this hands-on workshop, attendees have the opportunity to use the fossil horse teeth study sets and engage in an investigation of horse evolution, led by the team that developed and implemented the lessons and hear insider tips about working with very diverse audiences from both scientist and teacher perspectives.

Keywords: Fossil, Natural History Museum, Macroevolution, Biology, Life Science, Middle School, High School, College

J University of North Carolina Greensboro - GK 12

Stacy Curry

securry@uncg.edu

Additional presenters: Stacy Curry, Thomas Patterson, Kristy King

Bringing the Outside in!

A hands on workshop where UNCG resident scientists will run a six lab stations highlighting / what can be done with easily obtained materials from the outdoors. The goal of the workshop / is to emphasize how quickly teachers can utilize nature to perform interesting lab activities for / a variety of scientific subjects. Each activity will have three different variations for elementary, middle, and high school with a direct tie to the Next Generation Science Standards.

Keywords: Environmental Science, Earth Science, Chemistry, Biology, Physics, K-12

K WIPAC UW-Madison

Silvia Bravo

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Additional presenters: Megan Madsen

Astrophysics in the Classroom: Exploring the Universe with IceCube

IceCube is a cubic-kilometer detector buried deep in the Antarctic ice. This weird telescope explores the distant and extreme universe using tiny and ghostly particles called neutrinos. This is a hands-on

session where you will learn how to create research experiences for your students based on IceCube science and data. Available resources for teachers and students as well as scenarios for research-based projects in the classroom will also be discussed.

Keywords: Universe Exploration, Neutrinos, Matter and Forces, Physics, Astronomy, 9-12, South Pole

Index of all ITSP conference presenters

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Jennifer	Adams	JAdams@brooklyn.cuny.edu	Brooklyn College/CUNY	X		
Jennifer	Annetta	jenn@nmsfocean.org	NOAA Teacher at Sea Program	X		
James	Bader	jxb14@case.edu	Case Western Reserve University	X	X	
Vikram	Baliga	vbaliga@ucsc.edu	UC Santa Cruz/SCWIBLES			X
Loreto	Barcos-Munoz	loretobarcos@gmail.com	University of Virginia	X	X	
Teresa	Barnett	teresa@crscience.org	Community Resources for Science	X		
Sarah	Bartholow	sbartholow@arcus.org	PolarTREC	X	X	
Kristin	Bass	kristin@rockman.com	Rockman et al	X		
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Matthew	Johnson	mmj125@psu.edu	Penn State Center for Science and the Schools	X	X	
Kemi	Jona	kjona@northwestern.edu	National Alliance for Broader Impacts (NABI), Northwestern University	X	X	
Jennifer	Kaelin	Jennifer.Kaelin@ucsf.edu	UCSF, Science & Health Education Partnership		X	
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Tyler	Koep	koepx009@umn.edu	University of Minnesota	X	X	
Ben	Koo	ben.koo@ucsf.edu	UCSF, Science & Health Education Partnership	X	X	
Kristi	Korkowski	korkowsk@iastate.edu	Iowa State University			X

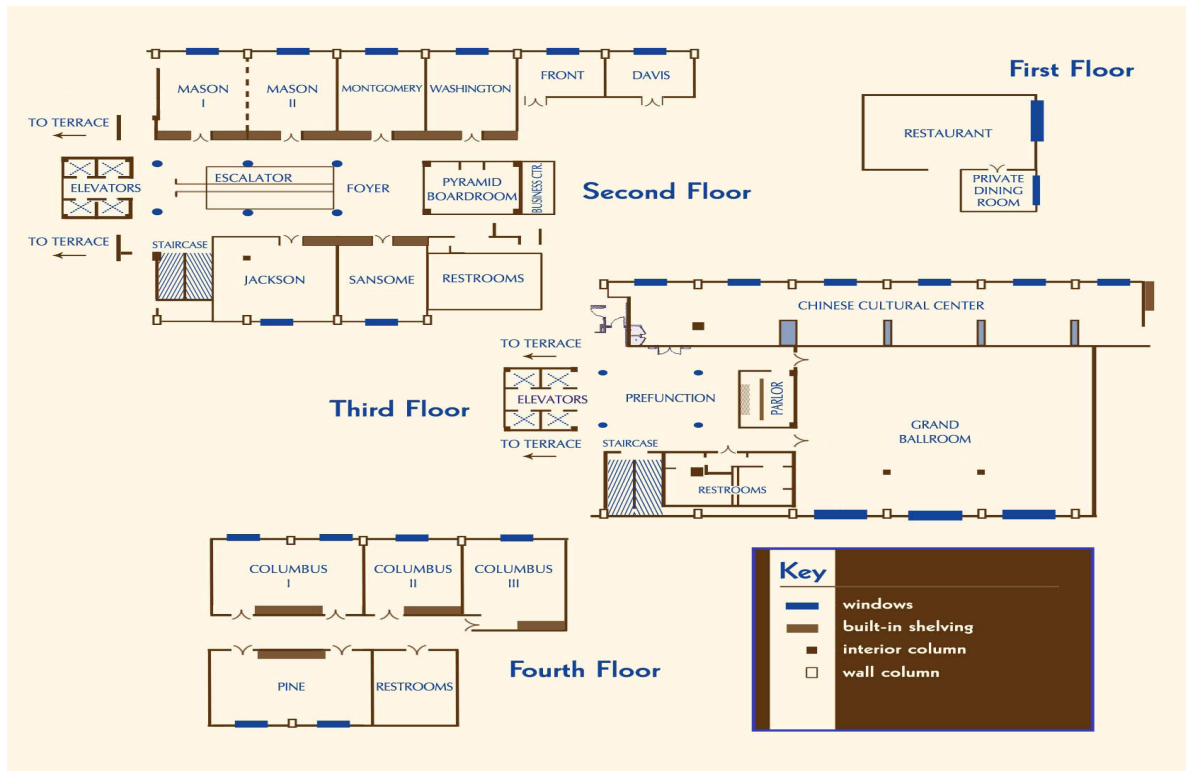
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Hilton San Francisco Financial District

Keynote sessions and lunch: Grand Ballroom - Third Floor

Break-out rooms: Mason I, Mason II, Montgomery, Washington - Second Floor



Evening Reception

February 11th, 6-8pm

Palio D'Asti, 640 Sacramento St., San Francisco

***You need to be registered for the reception. See the registration desk if you want to be registered. If you are registered and you no longer can join us, please let the registration desk know to allow people from the wait list to come in your place.

