Virtual Programs Featuring Scientists

Scientists, Science Centers, and Public Libraries working together to facilitate high-quality virtual programming for public audiences

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PORTAL to the Public

NASA@ My Library

PACIFIC SCIENCE CENTER

STAR net
Science-Technology Activities & Resources For Libraries

EDC Education Development Center

NASA@ My Library is based upon work funded by NASA under cooperative agreement No. NNX16AE30A. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Aeronautics and Space Administration.

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NASA@ My Library Project Overview

The work described in this guide, and the guide itself, was completed as a part of the *NASA@ My Library* project led by the Space Science Institute's (SSI) National Center for Interactive Learning (NCIL).

Through the *NASA@ My Library* project, NASA, public libraries, and state library agencies work together to increase and enhance STEM learning opportunities for millions of library patrons throughout the nation, including geographic areas and populations that are currently underserved in STEM education. *NASA@ My Library* is made possible through the support of the National Aeronautics and Space Administration (NASA) Science Mission Directorate (SMD) as part of its STEM Activation program.

The project is designed to promote access to NASA science discoveries and provide learning experiences to persons of diverse backgrounds. Libraries selected to participate in the project are located in rural and/or geographically isolated areas or serve underrepresented groups. Groups underrepresented in STEM fields include Hispanics and Latinos, African Americans, American Indians, Alaska Natives, Native Hawaiians and Pacific Islanders, the economically disadvantaged, people with disabilities, and women and girls.

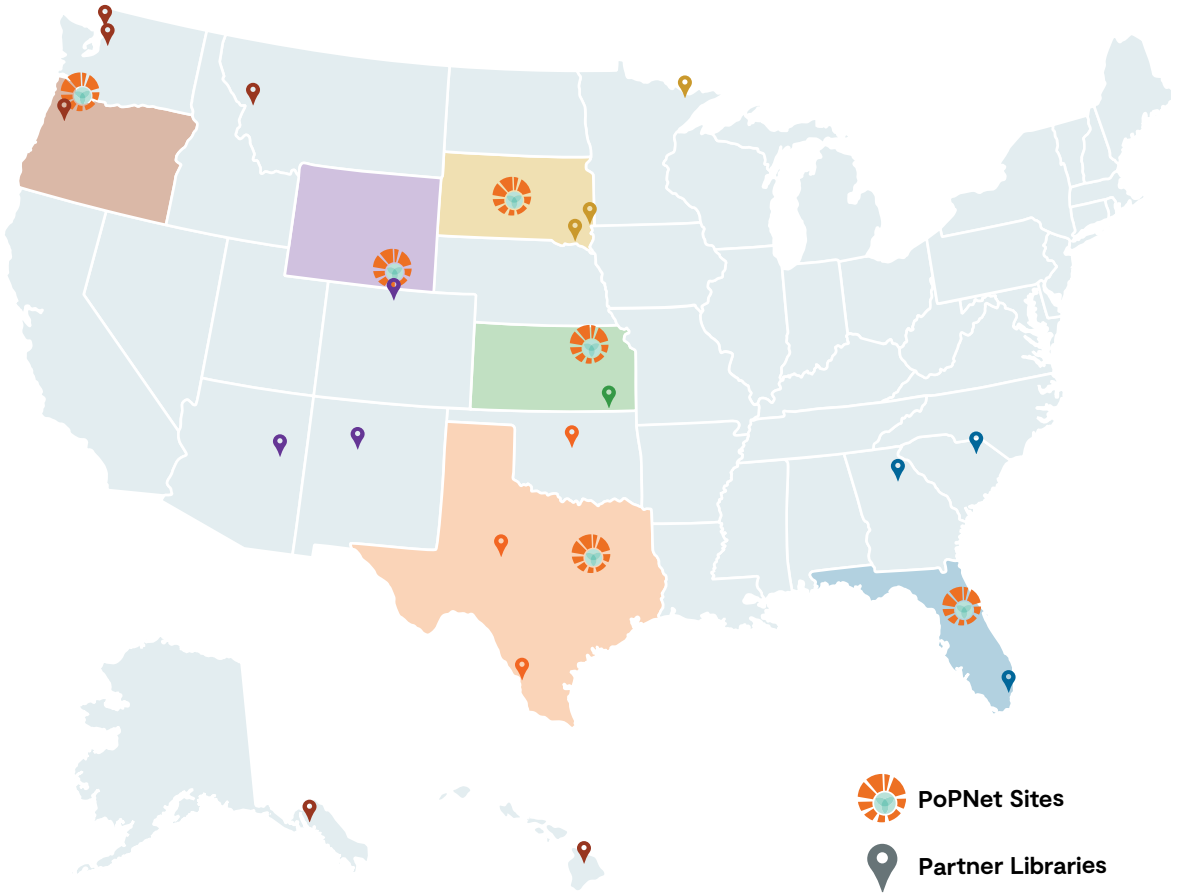


Figure 1. Map of participating PoPNet sites and library partners in the NASA@ My Library Project

NCIL—together with project team partners American Library Association, Cornerstones of Science, Lunar and Planetary Institute, Pacific Science Center, and Education Development Center—leverage the STAR Library Network (*STAR Net*) to advance the NASA SMD vision for education by engaging public audiences nationwide in informal and lifelong learning. *STAR Net* focuses on helping library professionals facilitate STEM learning for their patrons by providing "science-technology activities and resources" (STAR) and training to use those resources. The *NASA@ My Library* team engages key stakeholders (e.g., NASA subject matter experts (SMEs), public library partners, and state library partners) centered around high-profile NASA, Earth, celestial, and library events (e.g., 2017 solar eclipse, Earth Day, summer learning events at libraries). Key activities include stakeholder engagement, resource and experience development, professional development, a research project regarding patron interest development, and a comprehensive project evaluation effort.

NASA@ My Library resources are broadly available for informal STEM learning institutions to use in connecting learners to NASA science and exploration. Hands-on activities and supporting resources are curated for use in the library setting on the *STAR Net* STEM Activity Clearinghouse. Along with each activity, the Clearinghouse provides tips on facilitating the activity in the library setting; links to related content and online video clips; suggested books; and, where possible, how-to videos. Facilitators can search the Clearinghouse based on cost, ages served, content area, level of STEM proficiency required, and other parameters. Those wanting to integrate STEM tools such as digital microscopes, infrared thermometers, and telescopes to explore NASA science, can find programming ideas as part of the *STAR Net* "STEM Kits" resource area. Free games and activities on NASA science are also available. For more information on the resources mentioned, visit the Appendix.

Acronyms commonly used in this guide

NASA: National Aeronautics and Space Administration

STEM: Science, Technology, Engineering, and Math

PoPNet: Portal to the Public Network

ISE: Informal Science Education Organization

SSI: Space Science Institute

STAR Net: STAR Library Network

SME: Subject Matter Expert

About Portal to the Public

Created by Pacific Science Center, Explora, and The North Museum, and now led by the Institute for Learning Innovation, the Portal to the Public approach helps informal learning organizations connect public audiences with current science in their own communities through conversations with local scientists and engineers. The Portal to the Public framework has been implemented at over 50 organizations that form the Portal to the Public Network (PoPNet), a community of practitioners dedicated to sharing ideas and strategies for scientist-and-public engagement. Through funding from the Institute of Museum and Library Services and the National Science Foundation, PoPNet has expanded to a range of informal science settings including science centers, museums, universities, zoos, aquariums, botanical gardens, and research organizations.

The Portal to the Public project developed a Guiding Framework ("framework") that organizations use to build programs that bring scientists and public audiences together for meaningful conversations and activities about science (Figure 2). The framework contains the building blocks needed to create a feasible, realistic science engagement project. It is intentionally flexible, giving each organization the ability to design and scale the specific approaches and strategies best suited to that organization's vision, community, and overall goals. The framework has been supported by research and vetted by the dozens of member organizations of PoPNet.

This combination of specificity and flexibility makes the Portal to the Public Guiding Framework a unique tool that organizations of different types and sizes can use as they seek to create meaningful, sustainable projects. The framework is structured around three key components:

1. Relationships between informal science education (ISE) staff and scientists from entities such as universities, businesses, and government agencies
2. Professional development that prepares scientists for conversations with public audiences
3. Face-to-face public programs in which scientists and public audiences interact

When employing the Guiding Framework, organizations first consider the desired impacts they want to have on scientists, on public audiences, and on the organization itself. With these desired impacts in mind, the organization then undergoes a conceptual planning process to create an actionable plan centered on the Guiding Framework's three key components. Each organization within the Portal to the Public Network has used the Guiding Framework to develop and plan for their engagement programs that connect scientists with public audiences.

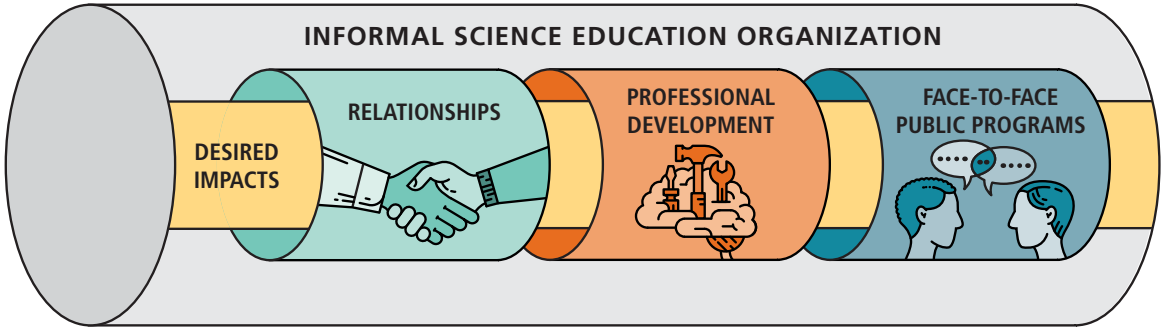


Figure 2. The Portal to the Public Framework

Introduction

Why virtual programming with scientists?

Portal to the Public is built on the premise that face-to-face conversations between scientists and public audiences provide an important opportunity to support public engagement with scientific research and its application. Critically, both scientists and public audiences are impacted by this type of dialogue: for public audiences, they may build a more personal connection with science and scientists; for scientists, they provide an opportunity to see how the public thinks about and is impacted by the scientist's work.

However, in-person, face-to-face experiences are not always feasible. Scientists often live in urban areas, where universities, research centers, and private labs are located, while a large segment of the U.S. population lives in more rural places. Typically, neither scientists nor individuals from rural communities have the time or resources to travel long distances to participate in programs.

Virtual programming can help close this gap. The goal of this project was to develop and host virtual public programs that achieve the same kinds of positive impacts seen in years of face-to-face public programs at PoPNet sites.

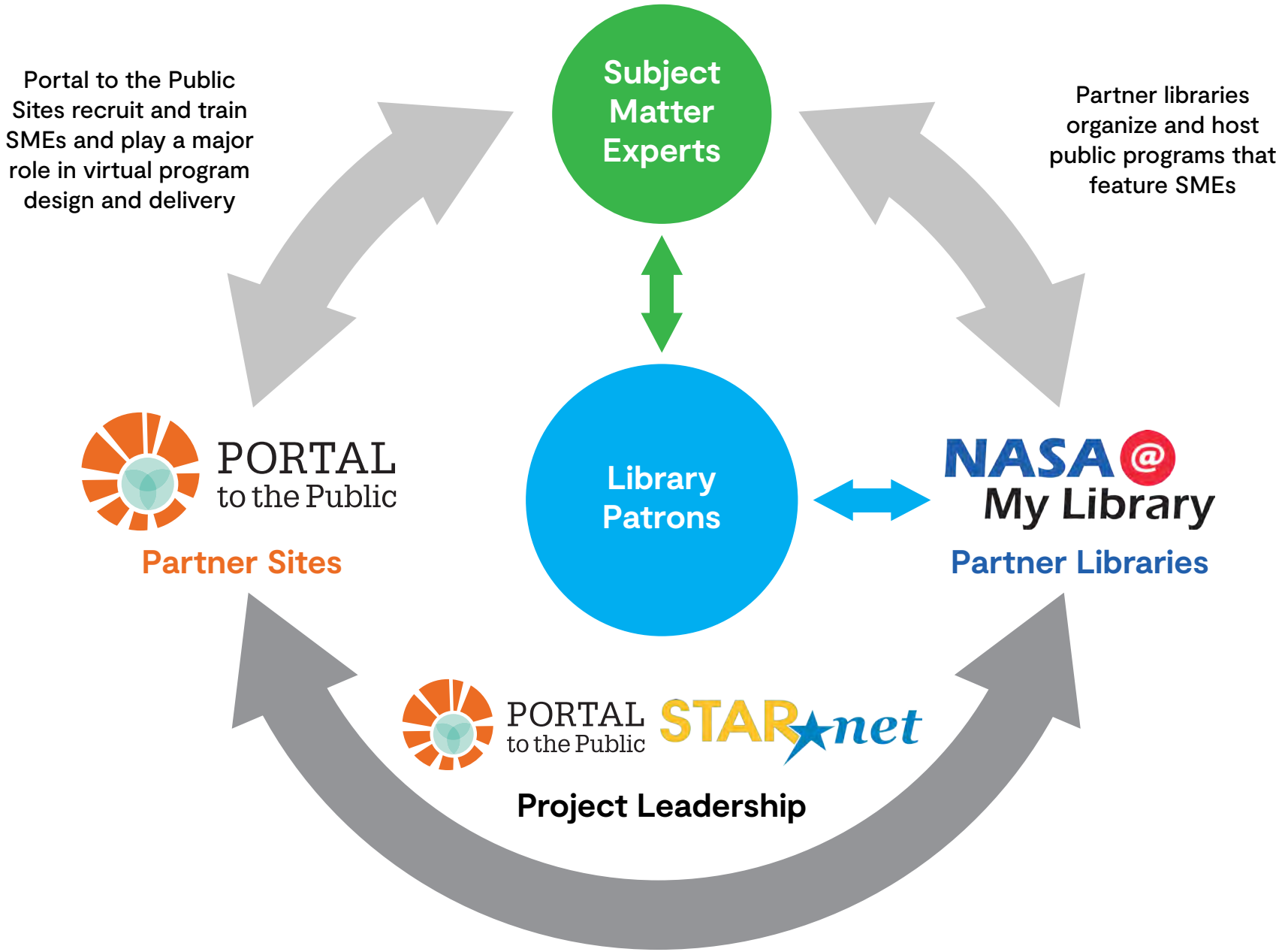
Thelma Parker Memorial Public & School Library

What does "a Portal to the Public approach" to virtual programming mean?

The ultimate goal of this work is to link public audiences with SMEs for high quality, engaging public programming about STEM topics.

Librarians and staff at ISEs each serve a critical role in preparing, coordinating, and hosting these experiences. Simultaneously, PoPNet sites were supported by PoPNet leadership, and partner libraries received significant support and resources from the *NASA@ My Library* project (specifically *STAR Net*). PoPNet and *STAR Net* are considered to have supporting roles in the model used. Although they provide valuable guidance and resources, high-quality virtual programs with SMEs can be implemented without these supporting players.

Each of these players brought unique expertise and served a specific role in planning and implementing virtual programs. The diagram and table below explain the role of each type of organization and describe the expertise they brought to the collaboration.


Portal to the Public Sites recruit and train SMEs and play a major role in virtual program design and delivery
Subject Matter Experts
Partner libraries organize and host public programs that feature SMEs
PORTAL to the Public
Partner Sites
Library Patrons
NASA @ My Library
Partner Libraries
PORTAL to the Public
STARnet
Project Leadership

		Key Roles		
		Library Staff	**Informal Science Education Organization Staff**	**Scientists**
Expertise		Community engagement in lifelong learning	Informal learning that is hands-on, interactive, and fun for all ages	Working knowledge of NASA science and exploration
Project Role	Preparing Scientists	Not involved	Recruit scientists Train scientists in effective public engagement and interactive virtual programming strategies	Attend training
	Designing Programs	Help design programs to be appropriate for library patrons	Support scientists in creating hands-on activities and preparing for programs Select and design program format	Create or identify and practice an appropriate hands-on activity for virtual engagement Develop and practice other program components
	Logistics and Technology	Actively promote virtual programs, including to underserved audiences Provide and test technology and online connection	Coordinate with library staff and scientist on NASA resources and logistics Test technology and online connection	Provide resources to help with program promotion Test technology and online connection
	Program Delivery	Co-facilitate hands-on STEM activities Facilitate conversations between library patrons and scientist (e.g., encourage patron questions, repeat questions to scientists for audio clarity, etc.)	Co-facilitate hands-on STEM activities and conversations (optional) May attend program in person to co-facilitate, if mutually desirable and time and resources allow	Facilitate hands-on STEM activities Engage library patrons in conversations and STEM experiences

	Supporting Roles	
	PoPNet Leadership	**STAR Net Leadership**
Expertise	Organizational strategies for connecting scientists and public audiences for meaningful conversations and activities about current science	Organizational strategies and resources for implementing STEM learning in libraries
Role	Provide training, resources, support, and guidance for ISE professionals	Provide training, resources, support, and guidance for library professionals

Table 1. Key and supporting roles in the pilot project. Supporting roles were important for the pilot project, but the virtual programs described in this guide are designed to be implemented with only the three key roles.

NASA science

The original Portal to the Public project used the word "scientist" to encompass a wide variety of science-based professionals and other subject matters such as engineers, technicians, and medical professionals.

The *NASA@ My Library* project focused specifically on connecting NASA-funded scientists with library patrons for virtual programs about earth and space science. Given this context, this guide offers specific recommendations on partnering with NASA scientists and engineers at universities and research institutes (highlighted in sidebars throughout), while describing partnering, training, and program strategies without a specific earth and space science focus. We believe the strategies can be broadly applied to working with scientists in any STEM discipline.

About this guide

This guide compiles lessons learned by seven Portal to the Public Network (PoPNet) sites as well as remaining challenges and recommendations for organizations planning similar efforts in the future. PoPNet sites used the Portal to the Public Guiding Framework to build relationships with local scientists, prepare them for public engagement using Portal to the Public training materials, and feature them at public programs.

The seven participating sites (Figure 1) were:

- Adventure Science Center in Nashville, TN
- Mayborn Museum Complex in Waco, TX
- Oregon Museum of Science and Industry (OMSI) in Portland, OR
- Orlando Science Center in Orlando, FL
- South Dakota Discovery Center in Pierre, SD
- Sunset Zoo in Manhattan, KS
- Wyoming NASA Space Grant at the University of Wyoming in Laramie, WY

These sites developed, tested, and refined virtual engagement strategies in two phases: an initial, eight-month pilot phase with two organizations (Mayborn Museum Complex and OMSI) followed by an expanded pilot phase with an additional five organizations. The strategies and recommendations outlined in this guide are based on the collective experience of these seven organizations. Organizations shared their experiences and lessons through monthly communication with project leadership, final reports, and an external mixed-methods evaluation completed by Education Development Center (EDC).

The guide is designed to accompany the Portal to the Public Implementation Manual and Catalog of Professional Development Elements (the "Manual"), a more comprehensive, practical resource for organizations planning to connect scientists and public audiences through conversations and activities. While most of the information in this guide can be used on its own, organizations intending to fully adopt this approach may want to use this guide in conjunction with the full Manual. See Appendix to learn more about accessing the manual.

> **"We were excited about working with more space and NASA-themed scientists; making connections with library partners in locations near and far; [and] learning to do virtual programming."**
>
> *—PoPNet site representative*

How to use this guide

The remainder of this guide is split into two main sections:

- The **Preparation Phase** section describes the advance work needed to plan and arrange for virtual programs. The Preparation Phase ranges from six to eight months (or sometimes longer) in advance to about one month before a virtual program begins.
- The **Implementation Phase** section describes the final set-up and delivery of virtual programs, including training of scientists and facilitating virtual programs. The Implementation Phase ranges from roughly one month to the day-of a virtual program.

In order to provide a general timeline for the major components of each phase, Figure 3 depicts the timeline used by the initial two pilot organizations, which each folded this program into their pre-existing Portal to the Public ("PoP") training program for local scientists and conducted multiple virtual programs.

One recommendation from evaluation of the PoPNet sites' work was to allow more time than what is shown in this timeline, if possible. Each pilot PoPNet site was asked to work with multiple scientists and put on multiple library programs. The exact timing of these phases and how to employ them will depend on the scale of your program, your overall timeline, and other factors.

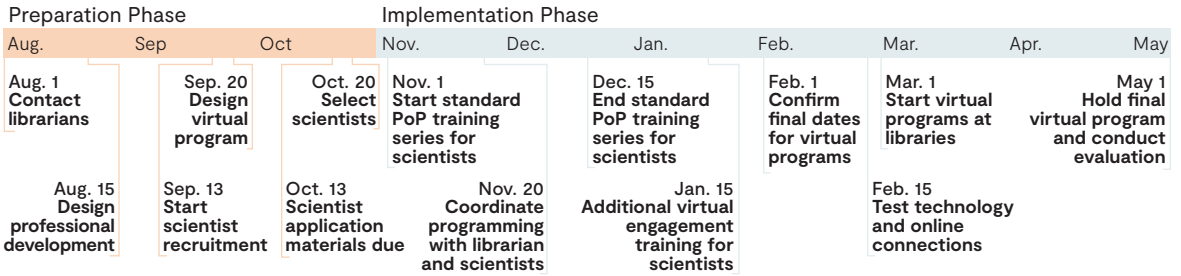


Figure 3. Sample preparation and implementation timeline

Early key findings

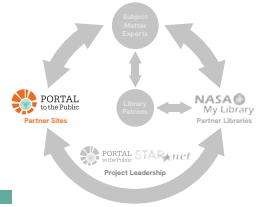
As a pilot project, evaluation was critical to determining whether this project's model was a worthwhile approach. Evaluation findings suggest that the approach is promising. Key findings include:

- There was a high level of agreement among librarians, PoPNet site representatives, and scientists that the virtual programs were successful.
- According to scientists and librarians, benefits to the virtual programs were reaching a broader audience (usually more rural populations) without travel time or funding, more flexibility in scheduling, and more scientists available to "visit" their library. Scientists appreciated being able to reach an audience that was not frequently exposed to scientists.
- The majority of librarians and scientists agreed there was a connection between the scientist and the audience despite not being in the same physical space.
- Over 90% of patrons indicated they learned a lot at their virtual program and that the program made them want to learn more about Earth science, space science, or engineering. Eighty-three percent of patrons agreed that the program made them want to look for more information about NASA science or careers.

Evaluation activities over the first and second phases included surveys of PoPNet site representatives, participating scientists, librarians, and patrons, as well as in-person and "virtual" site visits (in which an evaluator joined the online meeting to observe programs), and interviews with a sample of PoPNet site representatives, scientists, and librarians, and review of other project documents. See the Executive Summary in the Appendix section of this Guide for additional findings.

PREPARATION PHASE

Scientist Recruitment



Libraries and ISEs can and do hold high-quality public programs without the presence of scientists. However, scientists can enhance existing programming or be the highlight of a special program at a public library. They can share a high level of specific expertise, serve as career role models, and provide insider information on the life of a professional scientist.

Who? Participating scientists can come from a range of organizations, such as universities, research centers, government agencies, or local industry. Six of the seven PoPNet sites worked only with local scientists, but one site that struggled to recruit NASA-funded scientists locally worked exclusively with scientists in another state.

Why? Knowing why a scientist might want to participate in outreach is essential for recruiting. Here are some key reasons a scientist may want to participate in virtual outreach programs:

- **Altruistic motivations:** Many scientists are driven by the desire to "give back" to communities broadly speaking, or by reaching a certain demographic with whom they identify.
- **Professional development:** Key to this project's approach, training in communication builds critical professional skills and enhances a scientist's Curriculum Vitae (CV).
- **New outreach experiences:** Many scientists already experienced in outreach may be interested in virtual programming specifically as a new outreach format.
- Fun: Don't discount the appeal of a good time! Many scientists seek opportunities that allow them to have fun with others while thinking about science in a new, creative way.
- Insights: Scientists may be interested in getting public feedback on their work. Engagement programs that include time for two-way conversations allow for such input.

How? Recruiting scientists for virtual programs can be intimidating, particularly when you don't know where to begin or you are navigating a new relationship with an organization. Here are some strategies to help with recruitment challenges:

- Identify scientists who have expressed an interest in public outreach. This can be done by including specific questions about their experience in public outreach within the application.

> "Through this experience, I have gained invaluable experience in participating in outreach and public interaction with science."
>
> *—Scientist Survey Respondent*

- Reconnect with scientists whom you've worked with in the past and ask them to help you spread the word.
- Seek recommendations from scientists within your existing networks.
- Gather a list of scientists who have previously participated in science outreach programs in your community such as science cafes or lectures.
- Make personal phone calls. A personal phone call is usually harder to miss than another email in your inbox.
- Create simple recruiting fliers and materials that can be posted physically and virtually.
- Identify and reach out to university departments and research institutes that are working on a scientific project that aligns with the type of scientist you wish to recruit.

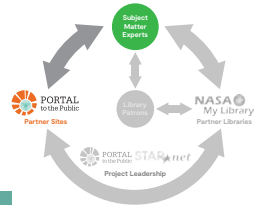
See examples of recruitment materials in the Appendix.

Strategies for recruiting NASA-funded scientists

- Contact leaders of NASA's Museum Alliance for suggestions and assistance in identifying NASA scientists in your area.
- Enlist the assistance of the management team from your local Space Grant Consortium to share information about your program and to recommend scientists.
- Send requests for application to NASA-funded EPSCoR scientists in your area.
- Reach out to education and outreach specialists at science research organizations supported by NASA for their assistance.
- Identify faculty whose research focuses on astronomy, planetary science, Earth science, or astrobiology; many of these are NASA-funded. Check their online profiles and CVs for indications that their work uses NASA data and for evidence of interest in outreach.
- Find members of the American Geophysical Union, the American Astronomical Society, or the American Astronautical Society in your area; many (but not all) are NASA scientists.

PREPARATION PHASE

Partnering with Libraries



Public libraries play an essential role in their communities, and that role continues to evolve as communities' needs change. Public libraries support cultural engagement and serve as gathering places. They are ideal partners for delivering virtual programs because they have event space, built-in audiences, existing STEM learning programs, and deep expertise in the interests of their local communities.

Authentic, working partnerships with public libraries are key for implementing the types of virtual programs described here. Consider the following strategies to start a partnership with a public library:

- To find public libraries to collaborate with, don't forget that state libraries can be a good source for information about libraries in their state. A good place to start would be the Youth and Family Services Consultant or equivalent.
- Different public libraries may have different organizational structures, with staff holding different roles and titles. Roles may especially vary between libraries of different sizes. If you don't have an existing contact, consider contacting the Children's/Youth Services Librarian, Teen Librarian, Library Program Coordinator, or Library Director.
- Coordinate programming with librarians at least six months in advance. Libraries plan a wide range of programs throughout the year, and summer programming is an especially busy time. Some libraries cement their summer programs as early as the preceding November! This long lead time will help the library effectively promote the program.
- Schedule an initial call to learn about the library's programs and preferences and to identify dates and times a virtual program could work in their schedule.
- Learn about the library's existing STEM learning programs and resources. Work together to connect the library's programs with the planned virtual program, including how they can complement the scientist's activity.
- Ideally, select participating scientists before beginning program coordination with the libraries. This will help you and the librarians determine which scientist is the best match for a library's target audience.
- Make initial contact with librarians via email, and follow up the email introduction with a phone call. PoPNet sites found phone calls to be the most effective means of communication with librarians to develop the virtual programs.

One major recommendation that came from evaluation of the PoPNet sites' work was to connect libraries with scientists directly, in advance of the program. For librarians, this deepened their understanding of the program; for scientists, it helped them gain insight into the potential audience and let them share tips for how the librarian could help promote and facilitate the activity.

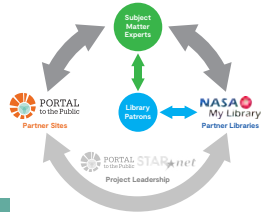
NASA@ My Library Partner Libraries

The *NASA@ My Library* project selected 75 public libraries as partners to facilitate STEM-related learning. Partner libraries received resources (kits), training (workshops and webinars), and support from project staff.

Twenty-two of those 75 partner libraries worked with PoPNet sites to host virtual space science programs with scientists. The libraries were strategically selected based on their geographical locations and the communities they serve. In most cases, libraries were in the same state as PoPNet sites; in others, they were hundreds or even thousands of miles away. See their locations in Figure 1.

PREPARATION PHASE

Program Design



It is important that virtual programs in the style of Portal to the Public are interactive, fun, and experiential for learners: programs should not just be a live video of a scientist's presentation. An ideal Portal to the Public-style virtual program has the following characteristics:

- Facilitation by a scientist or engineer
- Opportunity for two-way dialogue between scientists and library patrons
- Hands-on engagement that relates to the scientist's area of expertise

Beyond these characteristics, there is no single way to run a virtual public program. The table on the next page describes a few format examples as tested by PoPNet sites. Although still in early stages of testing, evaluation data suggest that these program formats show promise.

When you are co-designing a program format, consider the following questions:

- What are the ages of the program patrons? Will they be able to sit and listen to the scientist for some time, or would it be better to allow them to be more active throughout? Make sure any information you have about ages is communicated to scientists.
- What impacts should the program have on patrons?
- What capacity do you have to plan the program and to facilitate the program with your library partner?
- How many scientists do you have to work with for a single program?
- Will you or another staff member be able to attend the program in person? If not, how much assistance will the librarian have during the program?
- Who will take the lead on facilitation (the ISE organization, the library, or will the responsibility be shared)?
- Who will begin the program? Who will keep time? Who will end the program?

Sunset Zoo on tackling many issues at once using a virtual platform

"At the end of our training [which was facilitated virtually], we used a virtual connection to introduce the scientists to library staff. This was to begin building the relationship between the scientists who would be leading the program and the library staff who would be called upon to facilitate the hands-on engagement. Prior to this virtual connection, we sent bios of each scientist to the participating library. This virtual connection also served as a way to test connectivity at all participating locations all at once."

Presentation + Activity

Patrons experienced a brief presentation about a scientist's area of expertise, followed by a related hands-on activity facilitated by the scientist.

PoPNet site: Sunset Zoo

Library: Wilson Public Library, NC

Scientist: Marja, astrophysicist

Set-up: Screen to project scientist's presentation. Hands-on activity supplies at both the library and with the scientist.

Two-way dialogue: Librarians helped facilitate Q&A after the presentation. Librarians also helped scientists talk individually with patrons during hands-on activity portion.

Hands-on activity: Galaxy-sorting activity with printed photo cards

Benefits: Simple and appropriate for all ages. Presentation and hands-on activity support each other.

Challenges: With larger audiences, being able to engage the full group during hands-on activities can be challenging without strong facilitation.

Virtual Lab Tour

Patrons experienced a virtual lab tour of the Wyoming Infrared Observatory (WIRO) by two astronomers, and participated in astronomy activities and night-sky viewing on-site at the library.

PoPNet site: Wyoming NASA Space Grant

Library: Red Feathers Lake Public Library, CO

Scientists: Chip, and Hannah, astronomers

Set-up: In-person activities including telescope demo at library. Tablets and headsets with microphones for scientists giving virtual lab tour.

Two-way dialogue: Opportunity for open Q&A during virtual lab tour, facilitated by two-way audio and video.

Hands-on activity: In-person guided telescope viewing and other astronomy activities (in this case, led by an on-site scientist with help from the library)

Benefits: Gives patrons the chance to see where, how, and by whom science is done.

Challenges: Because lab tours require the scientist to be mobile, ensuring consistent, high-quality sound and video can be more challenging. Headphones with microphone is recommended for virtual lab tours.

"Expo-style" Multi-Scientist Event

Patrons experienced several tables of hands-on activities, facilitated by scientists via individual tablets at each table. Other tables held additional astronomy-based activities that did not require facilitation.

PoPNet site: OMSI

Library: King County Library Systems, WA

Scientists: Reed (medicine), Bryce (microbiology), Sang (physics)

Set-up: One table per scientist, each with an iPad and the scientist's hands-on activity. Speakers for each iPad and headphones with microphone for each scientist. Three additional activity stations with relevant activities.

Use of "break-out rooms" function of Zoom to move scientists into virtual "rooms" for conversations.

Two-way dialogue: Patrons engaged in one-on-one or small group conversations individually with scientists at each table.

Hands-on activity: Each scientist created their own hands-on activity, which they facilitated virtually.

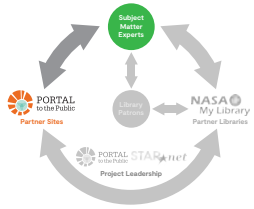
Benefits: Opportunities for patrons to engage at their own pace with multiple scientists and have more in-depth conversations.

Challenges: Required additional attention to and administration of videoconferencing software; ambient noise made it difficult for scientists to hear patrons.

Table 2: Examples of virtual program types

PREPARATION PHASE

Professional Development Design



It's true: training scientists in science communication and public engagement requires a time commitment from them and your organization! Portal to the Public believes the time spent is well worth it. Training serves three critical functions: 1) it improves the quality of the program experience for public audiences; 2) it increases scientist's confidence, helping them to feel more prepared, and 3) it can drive scientists to participate in the overall experience, since many are looking for skill-building experiences to build their professional expertise.

PoPNet sites use professional development activities (called "PD elements") found in the Catalog of Professional Development Elements of the Portal to the Public Implementation Manual. During trainings, scientists learned how to tailor how they describe their research to different audiences, conveying concepts from their work in different levels of detail and with appropriate vocabulary. They also practiced presenting in front of each other. In this project, six out of 12 scientists responding to a post-survey wrote that the most helpful aspect of the training and support they received was learning how to talk about their work in an accessible way that engages a diverse audience, including kids.

When planning your training for scientists, ask yourself the following questions before selecting the training format and specific PD elements:

- Are you working with local scientists or scientists from outside your community? If your scientists are far away, consider running your training virtually. See the Appendix for a sample of an agenda from Sunset Zoo, who facilitated their training virtually.
- How many scientists are you training at a time? If you have a small group (three or fewer) you might consider one-on-one coaching instead of a workshop format.
- Are you working with scientists who are new to outreach, or do they have some outreach experience? If they are brand-new, foundational communication skills and opportunities to practice skills in in-person programs will be valuable. While scientists with outreach experience still often benefit from foundational training, the focus can be more on training specifically for virtual settings.

The hands-on activity is another important part of scientists' preparation for virtual programs. For the hands-on activity component of a virtual program, scientists can either facilitate an activity that the library already has on-site as part of its STEM programming, adapt an activity they have previously used for outreach to be appropriate for a virtual setting, or create a brand-new activity.

To determine if pre-made or pre-designed activities are an option, speak with the librarian and the scientist together to learn more about activities the library may have on-site that could relate to the scientist's area of work. Encourage the scientist and librarian to access *STAR Net*'s STEM Activity Clearinghouse to search for appropriate activities.

If the scientists are adapting their own activities they have used previously for in-person outreach, make sure to go over what changes are needed to adapt the activities for 1) virtual experiences, 2) larger groups, and 3) materials that can be easily shipped (if applicable). Some scientists might benefit from additional phone, conference call or in-person meetings to get individualized recommendations.

When possible, Portal to the Public encourages that scientists have partial or full ownership over designing and creating their own hands-on activities based on their unique area of research; doing so can improve scientists' ability to engage public

audiences and increase their investment in their outreach efforts. See the Portal to the Public Implementation Manual for more guidance on assisting scientists in activity development.

Other recommendations from PoPNet sites include:

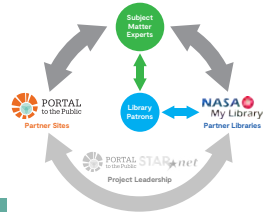
- Make sure to include time for scientists to become fully familiar with the specific virtual programming platform they will be using the virtual program. Ideally, they will be able to both practice facilitating with the platform as well as experience what it's like to be on the "receiving end."
- If they're available, invite librarians to call in during scientists' professional development to talk about their patrons and answer any questions.
- If facilitating the training virtually, create an online shared folder with all the workshop agendas and handouts. Share with scientists in advance, so they become familiar with the training material and outline.

South Dakota Discovery Center Training

South Dakota Discovery Center held their scientist training in two parts. First, they held a workshop using Portal to the Public PD elements. The first training focused on foundational communication skills and how to develop and facilitate a hands-on activity, with no focus on virtual engagement. Discovery Center staff believe this provided critical engagement skills to participating scientists. Then, they held a separate virtual training session to assist scientists in modifying their hands-on activities to make them appropriate and effective for virtual engagement.

PREPARATION PHASE

Logistics and Scheduling



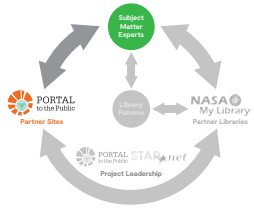
This model of virtual programming relies on effective coordination between three key partners (ISE staff, librarians, and scientists), so having a strong handle on logistics is critical! Here are some tips from PoPNet sites to help with coordination:

- Coordinating the libraries' and scientists' availability for scheduling the virtual programs can be challenging. It may be best to start by asking librarians about their preferred days and times for the virtual programs. Then, create a simple online poll with the library-preferred dates/times and ask scientists to indicate their availability. The sooner scheduling can begin, the better!
- Summer months are usually particularly busy for libraries. Take this into consideration in both communication and program planning.
- Stay in regular contact with scientists and libraries. When working remotely, regular communication is especially important to help everyone stay engaged.
- Create a document with an overview of the scientist's research and institution as soon as possible. Some librarians will rely on scheduling availability as the primary determiner, but others will prefer working with a scientist based on their research topic.
- Collaborate with librarians to develop a promotional package for each scientist, which can help libraries advertise the programs. The package should include photos, a short description of the scientist's work, and the hands-on activity. OMSI suggests asking scientists to create this marketing package themselves!
- Encourage the scientists and librarians to connect with each other prior to the virtual program to conduct a test run and discuss facets of the program, such as the set-up of the room, who might attend, and the facilitation of the hands-on activities. Be sure to use the same equipment in your test run as in the actual program.
- Establish a back-up plan in case of technology troubles. For example, ask both the scientist and librarian to share their phone number and to have a phone nearby during the program.
- If you are facilitating the professional development training virtually, ask partnering librarian(s) to join during the last training session to give scientists the opportunity to meet the librarian(s) and to learn more about each other's work.
- Send an email to the librarians and scientists in the days before each event. This will ensure that they have each other's contact information, and that you are all on the same page about how the event will run. Include a document with a detailed agenda of the event including specific timing and leads for each section. If possible, include a few facilitation tips for the librarians and scientists.

> **"Having the opportunity to meet with the scientist before the event to ask questions, go over the activity, or having the activity pre-prepped so we know what the final product will be were all very valuable preparation experiences."**
>
> *—Librarian Survey Respondent*

IMPLEMENTATION PHASE

Facilitating Professional Development



The hands-on activity is one of the most effective components of Portal to the Public-style virtual programs and what makes the program stand out from other virtual programs. Consider incorporating virtual facilitation strategies into your PD training and don't underestimate how challenging facilitating the hands-on component virtually can be for scientists. Ideally, scientists should complete more fundamental Portal to the Public training before you introduce the virtual component.

The strategies below come from the experience of the seven pilot sites in facilitating PD to prepare scientists for interactive virtual public programs. Evaluation suggests it is a good approach: twelve out of thirteen scientists who completed the follow-up survey agreed or strongly agreed they were satisfied with the training they received.

Consider the following facilitation strategies to ensure participating scientists are prepared for virtual engagement:

- Cover best practices for being on video.
- Have each scientist practice using the video conferencing software they will use in the actual virtual program. Record these practice sessions so scientists can review them and identify their own areas of improvement.
- If possible, meet individually with each scientist and go over how they might be able to adapt their hands-on activity for virtual engagement.

If you are facilitating PD training sessions virtually, consider the following strategies:

- Make sure to model techniques scientists are being asked to use and allow them to experience what their audience will experience when they engage with them virtually. For example, in what ways can you include a hands-on activity? In what ways can you include ample time for two-way dialogue?
- Introduce participants and give an overview of the workshop agenda before jumping into the training. Consider using a fun, STEM-based icebreaker.
- Don't assume all participants have access to handouts and training materials: double check at the beginning of the session!
- Find an example of an agenda from a training facilitated virtually in the Appendix.

> "[Hands-on activities in presentations] went well because we spent a fair amount of time in our training focusing on them developing those experiences. We had them present a prototype, where they received feedback, then they presented them in a face-to-face situation, and then we practiced them using the technology platform."
>
> *—PoPNet Representative*

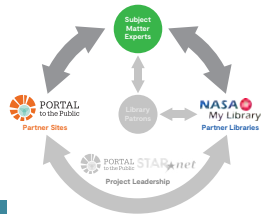
OMSI on preparing scientists for virtual programs

OMSI's training of scientists for virtual programs included a significant focus on familiarization with their selected platform, Zoom, as well as time spent to get them more comfortable with being on camera. Training included an introduction to Zoom, recorded practice sessions for scientists to review later, and watching and critiquing sample videos.

Additionally, OMSI staff led group discussions around adapting hands-on activities to work in virtual programs. The OMSI staff lead reported that "these were the toughest part—some activity ideas worked well and some were more complex. We tried to provide a simple idea for each scientist, but some had their own ideas or thought what we provided was too simple."

IMPLEMENTATION PHASE

Technology and Equipment



Once virtual programs are scheduled, make sure that library staff and scientists have the appropriate technology and equipment. A clear and consistent virtual connection between scientists and library patrons is critical for a successful virtual program delivery. Both scientists and library staff need to develop an appropriate setup to support virtual connections.

Provide support to scientists and library staff by recommending the appropriate technology and equipment necessary to conduct the designed public program.

Once the required technology and equipment has been gathered by or provided to scientists and library staff, make sure to test the technology and equipment setup prior to the event (never on the same day), and then again shortly before the event begins.

The following table provides recommendations for technology and equipment setups based on PoPNet sites' experience facilitating and delivering virtual programs at libraries.

Key Role	Monitor	Internet	Visual Hardware	Audio Hardware	Software
ISEs	Desktop or laptop for program facilitation. For "Expo-style" multi-scientist events, provide one tablet or laptop for each scientist station	Strong internet connection. A wired connection is preferred over Wi-Fi	Built-in or external webcam for program facilitation	Built-in computer speakers for program facilitation. For "Expo-style" multi-scientist events, provide headset with microphone or wireless speaker with a built-in microphone	Purchase video conferencing software, such as Zoom. Schedule meetings and share meeting information with scientist and library staff
Library Staff	Desktop or laptop. For a large audience, connect laptop to a projector or interactive display board		External webcam with USB extension cable. Set up webcam to allow scientists to view as many library patrons as possible	High volume capacity external speakers or wireless speaker with a built-in microphone	Download and install video conferencing software into laptop/computer. Test it and get familiar with the software prior the event
Scientists	Desktop or laptop. Laptop or tablet required for virtual lab tours		External webcam with USB extension cable. For virtual lab tours, consider moving the camera (whether on laptop or other), slowly so as to not cause dizziness	Headset with noise-cancelling microphone required for virtual lab tours and recommended for all types of programs.	Download and install video conferencing software into laptop/computer. Test sharing presentation or images, by using the "share" icon if using Zoom

Table 3: Recommendations for technology equipment each key player should have based on PoPNet sites's delivery of virtual programs.

Here are additional recommendations to convey to library staff:

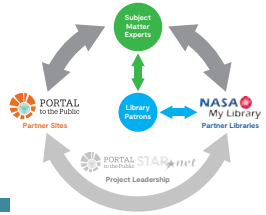
- If unable to move the webcam or if using a built-in camera, be sure to relay to the scientists what patrons are doing (e.g., lots of heads are nodding yes, three of the participants have raised their hand, this group just discovered..., the participants are struggling with...). The feedback is useful!
- If unable to obtain an external webcam and speaker with built-in microphone, bring patrons to the computer/laptop (close to the built-in camera and microphone) when providing responses, giving feedback, and asking questions.

Here are additional recommendations to convey to scientists:

- If unable to obtain a headset with microphone, make every effort to speak closely and directly into the built-in microphone on your laptop/ computer. Good sound quality is critical to a successful program!
- It can be hard to hear questions from the audience. Use headphones for better sound quality; it helps both library patrons to hear you and you to hear them.
- During virtual lab tours, make sure to use a headset with microphone, so that patrons can still hear your voice while the laptop or the camera is being moved around the lab.

IMPLEMENTATION PHASE

Delivering Programs



Before implementing your virtual program, think about the event support you will need for the host library in addition to the support you plan for the scientist presenter. Ask yourself the following questions: How can you help the librarian and scientist facilitate the program? Is the scientist broadcasting from your organization or from their lab/ office or even out in the field? How can you help troubleshoot if issues arise? Once you know how each of the key players will be involved in facilitating the program, consider these recommendations from PoPNet sites:

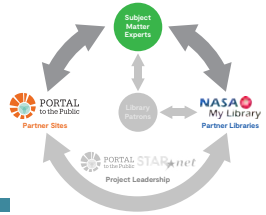
- Do a tech test with the library one to two weeks in advance using the exact same equipment that will be used during the event. Test the audio and video to make sure scientists will be able to hear and see the audience and that the audience will be able to see and hear the scientists. Make sure to test connectivity and plan for a back-up if needed.
- If the library is not providing activity materials themselves, mail the activity materials to the library so that they receive the materials at least one week in advance.

Thelma Parker Memorial Public & School Library

- Work with the librarian to brainstorm how they can best help facilitate the program, and make sure all partners are clear on expected roles. How active will their role be? Will they be expected to kick off the program?
- Try to include examples of anything the patrons will be making, and detailed instructions to make sure the librarian becomes familiar with the activity and can help if anyone is stuck.
- When possible, go over the activity with the librarian during these final preparation calls to answer any questions and make sure the librarian feels confident facilitating it.
- For each program, try to connect with host libraries well ahead of the scheduled presentation (about 30 minutes before) to work through any tech problems before the program starts.

IMPLEMENTATION PHASE

Continuing Relationships



Ideally, the relationships that you have established with scientists and host libraries will continue past any individual public program. These relationships provide the foundation for subsequent training, programming, and even future recruiting efforts. Below are a few strategies to help you nurture these relationships:

- Make sure to connect the librarian and scientist early in the planning process, and to support regular communication between the two so they can build a relationship.
- Plan time for the librarian and scientist to debrief the program to discuss what went well, what could be improved, and whether they are interested in working together in the future.
- Invite the librarian to be involved in the next professional development training, so that they feel invested in the virtual programming from the beginning. This will allow you to develop a stronger relationship, which will set your virtual programming for success.
- Keep librarians informed when potential program opportunities come up and when new scientists are trained.
- Share scientists' contact information with librarians (with their permission!) and encourage them to make arrangements to set up more virtual programs, if you don't have the capacity to coordinate the programs yourself.
- Involve previously-trained scientists in future training sessions, so they can share their experiences facilitating virtual programs with new scientists. This will help you maintain a relationship with them as well as benefit the program.
- When recruiting for a new cohort, ask previously-trained scientists to share the opportunity with other scientists in their field.

Wyoming NASA Space Grant on maintaining relationships

"We plan to continue working with our current NASA scientists, student volunteers interested in outreach, and also students involved in a new NSF high-altitude balloon project that will provide citizen science activities to schools throughout the state. We will train all of them in the use of virtual engagement as a means of connecting with schools, libraries, and the public. In Wyoming, this is very relevant because our state is so rural and weather can make traveling difficult, so we are excited to use what we have learned."

> "I hope it [access to virtual programs] is offered again and this continues so more libraries can join. With our programs, we want to give our patrons an experience they can't get from other places. So why would people come? A virtual scientist visit—that's something you don't get every day."
>
> *—Participating Librarian*

Mayborn Museum *NASA@ My Library* Fellowship Flyer

JEANES DISCOVERY CENTER

Mayborn MUSEUM

Mayborn Museum

NASA @ My Library Fellowship

Baylor University's Mayborn Museum Complex is pleased to announce three Mayborn Museum NASA @ My Library Fellowships during the 2017-2018 school year. Any Baylor University faculty or graduate students with NASA-funded research or work experience is welcome to apply.

The Mayborn Museum will provide Fellows with access to:

- Opportunity to present their current research virtually to library visitors in rural libraries in Texas, Oklahoma, or Louisiana
- Opportunity to fulfill outreach and/or broader impact requirements
- Free Portal to the Public workshop
- Recognition for working on a NASA-funded grant
- Reimbursement for all activity supplies
- Renumeration: $750 stipend for faculty or $500 stipend for graduate students

Application materials are due **October 13, 2017**.
Recipients will be notified by **October 18, 2017**.

For more information about eligibility and the application , contact **Emily Carolin** at Emily_Carolin@baylor.edu.

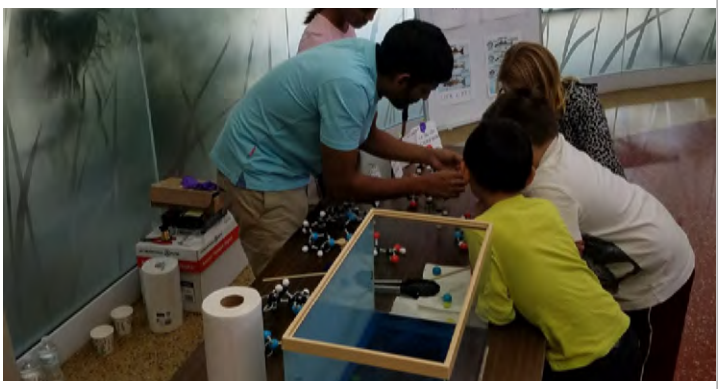
BAYLOR UNIVERSITY

Sunset Zoo *NASA@ My Library* Science Communication Fellowship Flyer

NASA @ My Library

SCIENCE COMMUNICATION TRAINING

Sunset Zoo Manhattan, KS — Behind the Science



Join Sunset Zoo, Pacific Science Center, NASA and others around the country in an innovative effort to engage public audiences about your NASA funded research. This opportunity builds off the Portal to the Public framework, Sunset Zoo's decades of experience in engaging public audiences, and unique partnerships to reach diverse audiences.

Benefits

- Enhance your science communication skills through a dynamic, engaging and participatory workshop
- Receive letters of acknowledgement suitable for sharing with supervisors and for grant reporting
- Join a growing network of science communicators engaging public audiences
- A personalized webpage to engage multiple audiences with your work on Sunset Zoo's Behind the Science website
- Honorarium for your participation in the amount of $600.00

Expectations of Participants

- Complete and submit a Behind the Science: Science Communication Workshop application
- Fully participate in 10 hours of science communication training provided by Sunset Zoo, and complete a short, online training module
- Participate in a pilot, public engagement program virtually with the Manhattan Public Library in Manhattan, Kansas
- Participate in a minimum of 2 virtual programs hosted at a NASA @ My Library partner and coordinated by Sunset Zoo

Learn More

To learn more about Sunset Zoo's Behind the Science Initiative, Portal to the Public, or NASA @ My Library visit:
www.ScienceMHK.com/370/NASA-My-Library

Contact Information

Jared Bixby, Sunset Zoo's Curator of Education
bixby@cityofmhk.com | 785.587.2737

SPONSORED IN PART BY:

ALA American Library Association

NCIL National Center for Interactive Learning

PORTAL to the Public

Portal to the Public is a communication network established through funding from the National Science Foundation and the Institute of Museum and Library Services Grants.

OMSI NAML Scholarship Commitment Agreement

OREGON MUSEUM OF SCIENCE AND INDUSTRY
1945 SE WATER AVENUE
PORTLAND OR 97214

As a recipient of the NASA at My Library tuition scholarship to the OMSI Science Communication Fellowship Program, I agree to the following:

- **Participate in OMSI Science Communication Fellowship Program:**
  - Attend the short course workshop series:
    - Workshop 1: Wednesday, June 20th 3-6pm
    - Workshop 2: Wednesday, July 11th 3-6pm
    - Workshop 3: Wednesday, August 1st 3-6pm
    - Workshop 4: Wednesday August 22nd 1-5pm
  - Work individually to develop a hands-on activity related to your current work. Ample concept development and materials support will be provided by OMSI staff

- **Attend a specialized 2-3 hour training on virtual programs between July and September 2018**
  - Date and time of the training is TBD and will be discussed in advance. Training will take place at OMSI.

- **Deliver between 1-3 virtual programs to a library between August and November 2018**
  - OMSI will work with you and library staff to arrange the event, and provide all necessary video conferencing equipment

- **Participate in other NASA at My Library Project needs**
  This may include:
  - Working with the OMSI team to further develop aspects of your demonstration (such as creating hands-on kits to send to participating libraries)
  - Providing feedback on the virtual programs training, delivery of the virtual programs, or other aspects of the project to inform future implementation of NASA at MY Library

- **Complete an official OMSI volunteer program application and submit information for a background check before participating in Meet a Scientist or other public-facing activities**

- **In addition to the NASA at My Library Scholarship commitments, participate in a minimum of three OMSI programs per year as long as I wish to remain an OMSI Science Communication Fellow.**
  - Fellows most frequently participate in Meet a Scientist, held on the afternoon of the second and fourth Saturdays of each month.

Name:_____ Date:_____

Signature:_____

Mayborn Museum Call for Applications Flyer

JEANES DISCOVERY CENTER
Mayborn
MUSEUM

NASA @ My Library
Fellowship Program

Baylor University's Mayborn Museum Complex is pleased to announce three Mayborn Museum NASA @ My Library Fellowships during the 2017-2018 school year. Any Baylor University faculty or graduate student with NASA-funded research or work experience is welcome to apply. Applications are due October 13, 2017 by 5:00pm. All applicants will be notified of their status by October 18, 2017.

NASA @ My Library is a pilot program that connects researchers with a NASA background to library visitors at rural libraries in Texas, Oklahoma, and Louisiana Recipients of a fellowship from the Mayborn Museum NASA @ My Library will present their past or current research and/or work in an interactive, engaging, and informative manner.

The Mayborn Museum will provide Fellows with access to:

- Opportunity to present their research virtually to library visitors in rural libraries in Texas, Oklahoma, or Louisiana
- Opportunity to fulfill outreach and/or broader impact requirements
- Free Portal to the Public Network workshop
- Recognition for working on a NASA-funded grant
- Reimbursement for all supplies related to a hands-on activity based on your research
- Remuneration: $750 stipend for faculty or $500 stipend for graduate students

Mayborn Museum NASA @ My Library Fellows are expected to:

- Attend a Portal to the Public Network workshop (2-hour time commitment)
- Work individually with Mayborn Museum staff to develop a hands-on activity related to your current work (2 to 3-hour time commitment)
- Participate in a minimum of 1-3 Mayborn Museum Portal to the Public programs (typically held in the afternoon on the weekend or a Thursday evening for 2 to 3 hours)
- Attend a specialized workshop on virtual programs (1-hour time commitment)
- Present a minimum of one virtual program to a regional library with the opportunity to present more
- Complete a Mayborn Museum volunteer program application before participating in Meet a Scientist or other public-facing activities

Appendix B: Marketing Materials

Mayborn Museum San Angelo Public Library Flyer

JEANES DISCOVERY CENTER

Mayborn

MUSEUM

NASA @ My Library Programs at Stephens Central Library

Does Space Have Weather? | March 12, 2018 | 2:00 - 3:00 pm

The sun emits electromagnetic energy and particles that interact with the Earth and the Earth's magnetic field. This system of emissions and interactions is called "space weather." Discover some of the space weather events that affect Earth and make your own solar flare. Presented by Dr. Trey Cade, Director of Baylor Institute for Air Science.

Making Robot Rovers | March 15, 2018 | 3:30 - 4:30 pm

Discover how a robotic rover, like those used on Mars, is designed. Explore aspects of autonomous robotic systems and answer questions such as: What does it mean to be "autonomous"? How can a rover know where it is on the planet? How do we make our rover move in a smart way? Participants will build a robot rover using Lego Mindstorm parts. Presented by Dr. Scott Koziol, Assistant Professor of Electrical and Computer Engineering.

Exploring Planetary Aerial Vehicles | March 22, 2018 | 4:00 - 5:00 pm

Explore the history of flight to discuss how original aircrafts were designed and how they may need to be different for flight on other planets. After discovering the characteristics that make up an aerial vehicle, we will design our own aerial vehicle for another planet. Other hands-on activities will help participants understand how air flows over different shapes to impact design. Presented by Dr. Anne Spence, Clinical Associate Professor of Mechanical Engineering.

All programs will be hosted in the third floor Community Room at the Stephens Central Library, 33 West Beauregard, San Angelo, TX 76903.

BAYLOR UNIVERSITY

Tom Green County Library System

San Angelo, TX

OMSI Anacortes Public Library Flyer

GAMMA RAY BURSTS

with Astrophysicist Tyler Parsotan

Thursday, April 26
3:30 pm

Free & all welcome

A special NASA @ My Library Program for teens! Astrophysicist Tyler Parsotan will present his explosive work via video conference. Staff from the Oregon Museum of Science and Industry and the Pacific Science Center will be present to facilitate a hands-on gamma ray burst simulation and experiment.

Anacortes Public Library
Worlds of Information and Imagination

OMSI
Everyday Encounters with Science

NASA @ My Library

Pacific Science Center

OMSI Polson Public Library Flyer

Key materials and support provided by:

OMSI
OREGON MUSEUM OF SCIENCE AND INDUSTRY

NASA@ My Library

North Lake County Public Library District

POLSON AMATEUR ASTRONOMY CLUB

North Lake County Public Library District
#2—1st Ave East,
Polson, MT 59860
northlakecountylibrary.org
(406) 883-8225

Sydney Weber

Neuroscientist at the Oregon Health & Science University
will be presenting remotely on how
radiation encountered during space travel affects memory and learning.

Join us at the North Lake County Public Library on:

Saturday, March 17th 2018 at 1:00 PM

for a family-friendly presentation, followed by a craft and light refreshments!

for more information about the Polson Amateur Astronomy Club and STEM programming at the North Lake County Public Library, email Kendra Mullison at kendram@polson.lib.mt.us.

NASA Media Release for Parent and Minor

Media Release for Parent and Minor

I, _____, am the parent/guardian/legal representative of
(Please print your name)

_____ and do hereby give permission
(Please print name of child)

for the above-named minor child (hereinafter "Minor") to be photographed and/or videotaped by NASA or its representatives. I understand and agree that the photographs and/or videotapes containing the image and/or voice of the Minor may be used in the production of instructional and/or promotional materials produced by or on behalf of NASA (hereinafter the "Program") and that such materials may be distributed or broadcast to the public and displayed publicly. I also understand that my permission to use the photographs and videotapes is for an unlimited duration and that neither I nor the Minor will receive any compensation for granting this permission or for the use, if any, by NASA of the Minor's image and/or voice.

I acknowledge that NASA has no obligation to use the Minor's image or voice in connection with the Program.

I hereby unconditionally release NASA and its representatives from any and all claims and demands arising out of the activities authorized under the terms of this agreement.

By signing below, I represent that I am at least 18 years of age and am the parent/guardian/legal representative of the above-named Minor. I have read the foregoing agreement and am familiar with all of the terms and conditions thereof and I consent to its execution by the Minor. I agree that neither I nor the Minor will revoke or disaffirm the this agreement at any time.

Signature of Parent/Guardian/Legal Representative of Minor:_____

Relationship to Minor:_____ Date:_____

Name and Location of Event:_____

Signature of Minor:
_____

Consentimiento para entrevista con los medios de comunicación de la NASA para padres y menores

Yo, _____, soy el padre/tutor/representante legal de
(Escriba su nombre en letra de molde)
_____, y por la presente autorizo a la NASA o sus
(Escriba el nombre del niño/a en letra de molde)

representantes a que entrevisten, fotografíen o graben en vídeo al menor de edad antes mencionado (en adelante, el "Menor"). Entiendo y acepto que el texto, las fotografías, o las cintas de vídeo que contengan las palabras, imágenes o la voz del Menor se podrán utilizar en la producción de materiales educativos o promocionales producidos por la NASA o en nombre de ésta (en adelante, el "Programa"), y que dichos materiales se podrán distribuir o difundirse al público y mostrarse públicamente. También entiendo que mi consentimiento para usar el texto, las fotografías y las cintas de video es por tiempo indefinido, y que ni el Menor ni yo recibiremos compensación alguna por la concesión de este permiso, o por el uso, si alguno, por la NASA de las palabras, la imagen, o la voz del Menor.

Reconozco que la NASA no tiene obligación alguna de utilizar las palabras, la imagen o la voz del Menor en relación con el Programa.

Por la presente relevo incondicionalmente a la NASA y sus representantes de cualquier reclamo y demanda que pueda surgir de las actividades autorizadas conforme a los términos de este acuerdo.

Al firmar abajo, declaro que tengo por lo menos 18 años de edad, y soy el padre/tutor/representante legal del Menor. He leído el acuerdo y estoy familiarizado con todos los términos y condiciones del mismo, y presto mi consentimiento para que el Menor celebre este acuerdo. Acepto que ni el Menor ni yo revocaremos o negaremos este acuerdo en ningún momento.

Firma del padre/tutor/representante legal del Menor: _____

Relación con el Menor: _____ Fecha: _____

Firma del Menor: _____

Nombre y lugar del evento: _____

Dirección: _____

Número de teléfono: _____

Correo electrónico: _____

NASA Media Release for Adults

NASA Media Release for Adults
(Do Not Use for Minors)

I, _____ do hereby give permission to be
(Please print name your name)

interviewed, photographed, and/or videotaped by NASA or its representatives in connection with a NASA production.

I understand and agree that the text, photographs, and/or videotapes thereof containing my name, likeness, and voice, including transcripts thereof, may be used in the production of instructional, promotional materials, and for other purposes that NASA deems appropriate and that such materials may be distributed to the public and displayed publicly one or more times and in different formats, including but not limited to, webites, cablecasting, broadcasting, and other forms of transmission to the public. I also understand that this permission to use the text, photographs, videotapes, and name in such material is not limited in time and that I will not receive any compensation for granting this permission.

I understand that NASA has no obligation to use my name, likeness, or voice in the materials it produces, but if NASA so decides to use them, I acknowledge that it may edit such materials. I hereby waive the right to inspect or approve any such use, either in advance or following distribution or display.

I hereby unconditionally release NASA and its representatives from any and all claims and demands arising out of the activities authorized under the terms of this agreement.

By signing below, I represent that I am of legal age, have full legal capacity, and agree that I will not revoke or deny this agreement at any time.

I have read the foregoing and fully understand its contents.

Accepted by:

Signature:_____ Date:_____

Name and Location of Event:_____

Address: _____

Telephone: _____

Email Address: _____

Science Communication Short Course Guide

Overview

Structure and Operations:

- The Science Communication Short Course is ideally scheduled over a three month period with this approximate structure:
  - Week 1: 1st Workshop
  - Week 2: One-on-one meetings
  - Week 3: One-on-one meetings (potentially add one more week here for one-on-ones)
  - Week 4: 2nd Workshop
  - Week 5: Materials shopping and assistance
  - Week 6: Materials shopping and assistance
  - Week 7: 3rd Workshop
  - Week 8: Final materials shopping and assistance
  - Week 9: Scientists mostly working on their own with activity (or there may be only one week between the 3rd workshop and the DC event)
  - Week 10: Workshop #4 (Prototyping Event)
  - Week 11: Scientists mostly working on their own with activity
  - Week 12 or 13: 1st Public Program

- Workshops can be held at OMSI or off-site (usually a university meeting room or classroom). We have found however, that participants are indeed willing to come to OMSI and holding the workshops on site contributes to smoother and more efficient operations for us and helps scientists get to know the institution better.

- We have found that the level of commitment and buy-in from scientists increases when they are required to submit a full application for the program. We also ask them to review and sign that they will commit to attending ALL of the workshops and events. It works best when workshops dates and times are pre-selected and clearly outlined in the recruiting materials.

- The ideal number of participants for a workshop is 15-20. However, the limiting factor for cohort size relates more to the time and energy required to assist scientists with developing their activity. Thus, it is much better to keep cohorts to about 15 scientists or less.

- We have found that it is important to require participation for all four workshops. In the event that scientists miss workshops due to illness or something unexpected, workshop facilitators

might consider sending that scientist some reading material and worksheets that relate to the content in that session. It also may be possible to ask the scientist to join that workshop in an alternate Short Course (even if it is a few months away).

Facilitation Strategies:

Quality professional development experiences are dependent on a skilled workshop facilitator. The best professional development experiences allow for participants' personal growth and learning through facilitated reflection and discussion, not through lectures from an "expert." Facilitators each have their own unique style for leading this type of workshop. It is important to spend time identifying and becoming comfortable with the style and strategies that work best for you. The following strategies may assist in this process:

- It is important to respect participants' time and commitment by running efficient and productive workshops. Begin on time and keep the agenda on track. Pay attention to how engaged participants are and don't dwell very long on activities or reflections that aren't working well or are overemphasizing a single point.

- Workshop facilitators need not be experts in everything, rather their primary goal is to facilitate an environment where participants can learn from each other, themselves (through their own reflection) *and* from the facilitator. It is OK to be answer questions with "I don't know, but that is a great question." There is nothing worse than watching a facilitator blather on, filling up space with words, when they don't actually have a great answer. This is often a good time to throw questions back out to the group and see if other participants have ideas to add. Admitting when you don't know often emphasizes the inherent complexity of and challenges related to communicating science to the public.

- When facilitating group discussion and reflection:
    - Ask questions to bring out key points. When there are no responses, ask more specific questions (remember the challenge with "why?").
    - Use a white board or poster paper to track brainstorms. This helps the group internally reflect on the content that has been brought out as a whole.
    - Periodically synthesize and comment on the participants' ideas. Take advantage of opportunities to link ideas or turn a participant's observation into anecdotal evidence of a relevant theoretical concept.
    - With brainstorms, you may find it useful to write out a list for yourself of the key ideas you want to come out in the brainstorm. As the discussion progresses, you can glance at your list and provide prompts to pull out ideas that have not been explored yet.
    - Make sure your voice is not overly dominating in group reflections. If you hear yourself talking too much, start to hold back.
    - Use at least a 6-10 second wait time after asking questions. As long as the facilitator remains calm and confident (not awkward!), this pause will contribute to an open and welcoming environment for everyone to participate.

Workshop 1: Designing Engaging Activities

This workshop sets the tone for the whole series in terms of professionalism, richness of content, and quality of experience. Many scientists do not know what to expect when they come to OMSI for this first workshop—some will be expecting to sit through a PowerPoint presentation the entire time. The first workshop in an opportunity to tap into scientists motivations for committing to the program (often an altruistic desire to improve public science literacy) and be clear about how you will help them achieve their own goals. Relationship building also begins in this workshop, it is important to take the time to greet and connect with each scientist personally.

Agenda	
Tuesday, June 9, 3:00-6:00pm Classroom 1	
Attendees	Lauren & Amanda, Facilitators
Goals	• Build understanding of OMSI's institutional mission and vision. • Introduce and frame OMSI, the informal science education field and the education staff as having significant and valuable expertise related to communicating current science and designing engaging learning experiences. Enhance appreciation and awareness for the breadth of expertise coming out of ISE research and practice. • Clearly explain the goals and features of the Short Course and the Fellowship program, specifically outlining scientists' commitments and the resources available to them through the program. • Increase knowledge of: - The power of personal discovery for learning - The qualities of engaging learning experiences (materials and characteristics) • Provide opportunity for personal reflection and brainstorming (related to each scientist's own research and potential activity).
Welcome & Introductions 30 minutes 3-3:30pm Initial welcome - LM Introductions – AF OMSI vision –	Welcome participants Introduce general program goals and OMSI staff facilitators -Thank participants for joining program and express excitement for the work we'll do together. -This program is only the start- we hope this turns into a lasting relationship with OMSI -Explain why the program is important to OMSI and our goals to bring current science to the public. Building Motivation & Sharing Context Introductions and Brainstorm: • Ask participants to introduce themselves, sharing their name, area of research and one or two items that will help fill two separate brainstorms being recorded on sticky paper or separate sections of a white board at the front the room. The two brainstorms should be: o Why public engagement with current science is important o Challenges and barriers to public engagement with current science

LM Fellowship overview - LM	• As participants add note to the brainstorm, feel free to make *brief* comments about connections between the different ideas. Also nod, smile and otherwise indicate your agreement with and interest in the answers. There is no need to notate items that have been expressed more than once, however you can use stars or underline to show emphasis as the brainstorm builds. • Once introductions are complete, ask if there are any other points that they would like to add. Comment that it is a great list – they have made a great case for why this type of work (that you are doing together in this program!) is important and valuable. Note that the barriers they listed are very real – this work is not easy and we aren't here to give them a quick fix. Rather, we need to take this charge seriously and work together on this effort. Explain that OMSI agrees strongly with the list of why this work is important – this is why we are here and offer so many different types of community programs. • Explain that luckily, we aren't in this effort alone and there are lots of tools available to help us. There is a vast amount of knowledge from science communication (and informal science education / public engagement with science / public understanding of science / learning sciences) practitioners (like us!) and researchers. Yes, there is actually a lot of research that helps us understand how people actually learn science and how to create meaningful experiences that have real impact. • And it is that research, and the wealth of experience from practitioners of all types, that we base this workshop series on. Draw attention to the OMSI vision map and mission statement. (or use a poster or PowerPoint slide). Identify key words that really stand out. Ask participants what they notice. Science Communication Fellowship Program Overview: • Pass out the "Short Course Overview" document. Explain requirements and overall structure of the course. • Frame Fellowship program as a community, and part of OMSI. New program, current participants, relationship to volunteer program, benefits, long-term relationships.
The Pleasure of Finding Out 60 minutes 3:30-4:30pm Facilitator: Lauren	• Portal to the Public PD Element (look in catalog). • See OMSI variation to structure and focus of the activity (no poem, a bit more straightforward, connecting this inquiry to inquiry in real research, etc.). See separate program outline (see "LR Pleasure of Finding Things Out Notes" in Q:\Programs\(415) Strategic_Partnerships\Science Communication Fellows Program\Science Communication Professional Development\Workshop 1\The Pleasure of Finding Things Out).
Break 10 minutes 4:30-4:40pm	

Why Why Why	• Show triangles and discuss ways of communicating • Do why why why worksheet (about 1 min per question) • Find partner and spend 2 min (timed) saying what you do and why your work is important- provide a framing that includes why your work is important. Pay attention to what level you're talking about (from your 3 whys). • Debrief: how did it go? How did that feel? How was it the same or different to how you communicate about your work with friends, family, coworkers, etc.
Concept Mapping 30 minutes 5:20-5:50pm Facilitator: Amanda	• Portal to the Public PD element (look in catalog). • Ensure that participants have at least 15 minutes to spend developing their own concept map and that there is at least 5 minutes for large group debrief at the end.
Activity Showcase 40 minutes 4:40-5:20pm Facilitator: Amanda	• Portal to the Public PD element (look in catalog). • Review Fellows Activity Development Process handout. • Remember to update the slideshow as necessary and review so you can explain a few examples in full and so you remember the content. Slideshow is found at: Q:\Programs\(415) Strategic_Partnerships\Science Communication Fellows Program\Science Communication Professional Development\Workshop 1. • For the last two example slides, show the actual physical activity materials (COPPE thin films; CRPA solar data). • Review process for 1:1 meetings • Make sure that the Fellows "charge" is really clear
Closing 10 minutes 5:50-6:00pm Facilitator: Lauren	• Thank participants and go over any logistical details for scheduling and prep for one-on-one meetings, etc. • OMSI volunteer program logistics: ➢ The next workshop will include 1 hour of volunteer orientation ➢ We will send you a volunteer application form ahead of the workshop to fill out and turn in ➢ We will send you an email with instructions on how to submit information for background check • Ask participants to fill out evaluation form or participate in "Gots & Needs" (if necessary)

Workshop 2: How People Learn

By the second workshop, the atmosphere should be even more relaxed. The first set of one-on-one meetings has occurred, thus, relationships are more developed. Scientists should be comfortable with the program expectations and feel some excitement (and anxiety) about developing their activity. Now that trust is established and scientists are "hooked" on the program, this workshop is a perfect opportunity to lay some more groundwork regarding the theoretical underpinnings of how people learn in informal environments.

Agenda	
Tuesday, July 14, 3:00-6:00pm Parker Room (?)	
Attendees	Lauren & Amanda, Facilitators 13 Fellows Intern (Mackenzie)
Goals	• Increase awareness and appreciation for the value of informal learning experiences. • Increase knowledge of: - How people learn (specifically, how each individual's prior knowledge, interest, and motivations affect learning) - Strategies to communicate complex ideas that take into account how people learn • Provide opportunity for personal reflection and brainstorming (related to each scientist's own research and potential activity). • Provide official PSC HR orientation and facilitate completion of relevant paperwork.
Welcome 10 minutes 3-3:10pm Facilitator: Lauren	Welcome participants • Comment that it was a joy to meet with each scientist individually and you are excited to see so many great activity concepts moving forward. It may be worth noting to the group that (like normal) the activity concepts are in all different stages but that there is lots of time to work with each person to get them done (just so if someone doesn't have a good idea yet or if they are really stuck they don't feel bad). • Explain that for most of this workshop, we will actually be stepping back from the detail of developing activities to think about some broader context and theory related to how people learn. We think that this theory is important because educational experiences designed with this in mind are so much more effective. And, it will be fun. • For a long time learning was seen as one way- I talk, you listen and since I taught it, you learned it. but now we know that's not how it works- all learning is affected by our own motivations, interests, environment, and prior knowledge. This is the constructivist view of learning. Constructivism is based on observation and scientific study and says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences.

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	• There has also been a lot of research done on how people learn in informal environments. We know a lot about what that learning looks like and how we can better support it. It's a young field with a lot left to learn, especially in long term impacts. • In 2009, a National academies book came out. It's a fantastic synthesis of the best research around learning in informal environments. It made a stand in the informal learning field about describing lots of strands of learning. When we say learning, we don't just mean knowledge learning such as remembering facts. (Go through strands). • There's a wide variety of impacts about science learning we are trying to make. Your activity might fit really well into one of these impacts. Maybe your activity would do well to talk about the process of science, or maybe you're really great at talking to people and your activity will be more about science identity. We want to hit on all these strands as a museum, but each individual interaction may only focus on one or two strands of learning.
Making Meaning 30 minutes 3:10-3:40pm Facilitator: Lauren	***Intro (5 minutes)***: - Throughout our lives, meaningful and memorable learning experiences happen in a variety of settings. (Hand-outs, start with Lifelong and Lifewide learning) - Blue represents waking hours during a person's life, and orange represents formal learning (school). What do you notice about this graphic? What strikes you? There's a huge opportunity throughout our lives! - A lot of learning is social, cultural, and implicit. Our knowledge and understanding is always growing and changing. ***Story (10 minutes)***: - *Individual reflection (4 minutes):* First, think of an example of an informal learning experience (outside school, examples). After choosing, consider what about the experience made it meaningful or memorable. Use the sheet to capture thoughts. - Could be at a museum, zoo, park, at home. - From early childhood or as recent as yesterday - "Meaningful" or "memorable" can be defined by you - *Share with partner (6 minutes):* After considering the memory, please share with a partner. ***Meaning (6 minutes)***: → These experiences don't just "happen," though it often feels like that to the learner. More often, they are constructed carefully and designed by some sort of informal ed. professional. → Fellows can and will create these types of meaningful experiences for visitors. Magic won't happen for everyone, but you never will know when the magical moment between facilitator, activity/materials, and visitor will occur. - *Instructions:* Considering your meaningful experiences, take a few moments to think about what specific qualities made the experience meaningful. When ready, share your qualities with your partner. Identify common characteristics or really striking ones. It was funny, it was social, beautiful, inspiring. Write one idea per sheet. Try to do at least 2, no more than 5. Put them on the board. - After you've brainstormed a list, choose two key/favorite qualities that stand out to you and your partner and write them on the provided sticky notes. Then

	post to whiteboard. - Find common characteristics: Now with same partner, pick common characteristics that made it meaningful. - ***Group discussion & List Creation (9 minutes)***: - What did our experiences have in common? Any patterns? Repeated qualities? (Discovery, independence, imagery, beauty, content?) - Does anything on the board surprise you? - How many experiences involved some type of interaction with another person or materials? (raise hand?) - Generate list of "Elements of Meaningful Experiences" → Learning is inherently **personal**, with real meaning-making happening within the individual learner. As facilitators, will support this learning by working on these qualities and paying attention to the unique needs and interests of the learners in front of us. - There are specific tools and strategies we can use to make activities have these qualities. They feel accidental, but they are very deliberate and part of the qualities we put into activities as designers.
Personal Learning 20 minutes 3:40-4:00 pm Facilitator: Amanda	*Mostly as written in PoP PD Catalog ***Play (5 minutes):*** - Prompt participants to play with the pincatudas. Offer no guidance. After about 3 minutes, distribute a worksheet for each person. Ask participants to capture quick thoughts on the worksheet while they continue to play. ***Sharing & Discussion (7 minutes):*** - Lead a round robin of all responses for each word. Run it quickly, without discussion. - Once the round robin is complete – briefly prompt reflection around similarities and differences in the answers. o Point out similarities in some answers o Where were there differences? Where was there an answer that someone had that surprised you? ➔ This activity demonstrates that learning is personal. Even with the same phenomena in front of us, we all respond differently. We each bring our own interests, motivations, curiosities, associations, prior knowledge, and misconceptions into every experience. It influences how we interpret something, how we experience it and ultimately how we learn and process it and make meaning. We know from learning research that if we design learning experiences that acknowledge and support personal learning – they are stronger. For example, if I was going to build off this activity here – it would be stronger if I let XX explore the gears, while XX would look into the marketing, while XX would set up races… ***Reading (5 minutes):*** - Read Fish is Fish by Leo Leoni ***Final Reflections (3 minutes):*** - Ask: Does this resonate? - How do you find out what the fish is in someones brain? What are the signs and signals? ➔ It is important to always remember that you don't know what the fish is in someone else's head. Two-way dialog and watching for cues in verbal and body language will

	help you navigate. Get feedback, but also Listen to that feedback and be responsive. Don't assume they know, but also don't assume they don't know. Be OK with a range of conversational outcomes and let the visitor's interests drive the conversation. ➔ If time, pass out worksheet about prior knowledge. As much as we talk about how everyone is different, we also want you to think generally about what the categories are that you expect to run into. You might not know exactly what people will be interested in- that the toy reminds them of a clock, for example, but you can probably predict some of the things they'll know and be interested in (wanting to know how it moves).
Break 10 minutes 4:00-4:10pm	
Building a Common Vision 50 minutes 4:10-5:00pm Facilitator: Amanda	• PSC PD element (look in catalog). • Generally, we order the images in this order: light bulb and triangle image (round 1), landscape (round 2), three diagonal images (round 3). • There are numerous prompts and observations the facilitator can make that will lead to the specific strategies that are on the list: - Looking for literally drawn analogies like a smiley face in round 1 - Issues with sequencing and framing - Scratching out and re-drawing (can we do this well in our heads?) - Choices from the facilitator about level of detail • With this element, Lauren has always tried to save enough time for the Expert Blind Spot worksheet but only ends up having time about half the time. It is worth trying to fit it in though! It is generally copied on the back of the Prior Knowledge worksheet.
Volunteer Orientation 55 minutes 5:00-5:55pm Facilitator: Marianne	
Closing 5 minutes 5:50-6:00pm Facilitator: Lauren & Amanda	• Thank participants • Reminders for materials lists • Reminders for volunteer forms • Ask participants to fill out evaluation form or participate in "Gots & Needs" (if necessary)

Workshop 3: Facilitation Strategies

This workshop focuses mostly on specific facilitation techniques and gives participants ample opportunity to practice and reflect. At this point they are usually really ready for this! The practice and concrete skill building generally relieves some anxiety gets scientists excited for the next step – actually prototyping their activity. Scientists are likely dealing with construction issues for their activity, so it is nice to plan for time before and after the workshop where staff is available and can assist with those issues.

Special note:
In the workshop reminder email, ask participants to bring their activity or pieces of what they have prepared (print outs, rough props, mock-up, photos, sketches).

Length: 3 hours

Goals:

- Increase awareness and appreciation for the value of informal learning experiences.
- Increase knowledge of specific facilitation strategies such as: inviting initial participation, questioning, and avoiding jargon.
- Provide opportunity for personal reflection, brainstorming, and practice (related to each scientist's own research and potential activity).

Agenda:

1. Welcome and review workshop goals (10 min.) *This shouldn't take 10 min. but workshops rarely start right on time even though they SHOULD.

2. Invitations to Participate (20 min.) - LM
   - Ask scientists to act out skits
   - PSC PD element (look in catalog).

3. Questioning Strategies (45 min.) – AF
   - PSC PD element (look in catalog).

4. BREAK (10 min.)

5. What's in a word? (25 min.) - LM
   - PSC PD element (look in catalog).

6. Gender Equity (15 min) - AF

7. Talk to your Neighbor (35 min.) - AF

- PSC PD element (look in catalog).
- Scientists can use the activity pieces that they brought with them in their conversations. Remind them to create a full two-way dialog (invite participation, use questions, etc.).

8. Final reflection (10 min.) - LM
   - Go around the room and ask each participant to share one thing that they are most excited about for their public program, and also what they think will be their greatest challenge.

9. Final logistics (10 min.) - AF
   - Show participants the Fellowship certificate – explain that they will get them after their first public program (if that is the policy you decide).
   - Go over any final logistics for materials purchasing, event scheduling, Discovery Corps prototyping event, etc.

Activity Development

1st One-on-one Meeting

The first one-on-one meeting is generally scheduled sometime between workshop one and workshop two. In early Portal to the Public program development, we made these meetings optional, but over time have realized how critical these meetings are for developing strong activities and for creating good experiences for the scientists.

Ideally, the first one-on-one meeting will involve two PSC staff members and one scientist (if two scientists work on the same topic and intend to co-develop one activity, then they should both be at the same one-on-one). One PSC staff will be the primary facilitator and the other will be the primary note-taker (while also contributing ideas and comments). It is best if this first meeting is held in a scientist's work space or lab. This helps the PSC staff get to know the scientist and his or her institution better and also allows the scientist to share graphics, materials, and tools while explaining their work. The meetings should be scheduled to last about 90 minutes. We have found that it is best to not schedule more than 3 meetings per day – the conversations can be mentally challenging and exhausting!

Length: 90 min.

Goals:

- Establish mutual trust and respect.
- Develop personal and friendly rapport.
- Allow scientists to articulate key messages and content related to their own work and personal story as a scientist.
- Help PSC staff members understand key messages and content related to the scientists work.
- Begin process of activity development, ideally ending the meeting with a realistic concept and a plan for next steps.

General agenda (timing is very flexible):

1. Scientist Interview (20-45 min.)
   - PSC PD element (look in catalog)
   - During the conversation, the facilitators should be contemplating possible activity ideas (without sharing with the scientist just yet). Work on identifying the major concept that the scientist seems most excited about sharing. Think through a few potential visitor experiences that would be most aligned with our standards (inquiry based, allow for discovery, multiple manipulative possibilities, etc).

2. Concept Mapping (use as needed)
   - PSC PD element (look in catalog)
   - Scientists were introduced to this tool during workshop 1. Scientists should have a partially or fully drafted concept map with them at the meeting.
   - If a scientist is having difficulty articulating their work, or if you are stuck during activity brainstorming, this tool can be useful.

3. Activity Brainstorming & Concept Development (30-60 min.)
   - When it is time to transition to specific activity and concept development brainstorming, be clear that you are shifting focus. Begin by asking the scientist if they have developed any ideas on their own, perhaps before the meeting. It is awkward if the facilitator launches into their ideas before giving the scientist time to share.

   - Through the conversation, help to frame:
     a. critical content
     b. conceptual idea of activity
     c. the visitor experience

     Then focus on materials

   - Throughout the conversation, keep an open mind and ask them to keep an open mind (not to settle on one idea immediately).

   - Ask questions to clarify the visitor's experience, activity functionality, and content objectives (the facilitators should ask each other questions to clarify their ideas as well as asking the scientist). This time frame is really tight and people often come up with great ideas, but don't explain it to each other super well. You don't want to reject an idea before everyone in the meeting has a solid conception of it. Use sketches to clarify ideas.

   - To clarify ideas, walk them through a visitor experience ("Let's say someone walks up… what will happen first…")

   - Watch the scientist for cues that we've strayed off course (hesitation, discomfort, stubbornness). When this occurs, clarify if the content is correct and still aligned with their research. Try to identify what are they are comfortable with (in terms of facilitation and scope and difficulty of construction).

- Be encouraging and provide specific positive feedback regarding not just if an idea is good, but why it is good ("this activity allows the visitor to discover concept X on their own" or "with this concept, you would really be able to draw a lot of connections back to your own research and what you are most fascinated about"). This will help them carry those qualities all the way through as they are constructing and facilitating.

- Don't be afraid to push back, challenging ideas that do not provide opportunities for inquiry or that do not relate well to a scientists own work.

- In terms of materials and construction, do your best to keep expectations realistic. Look for cues about what a scientist will be able to build his or her self. You may need to remind them that once we purchase materials, they will be responsible for constructing the pieces themselves (with the exception of some exhibits shop help for drilling, cutting, etc.). For example, steer them away from a concept where they might have to construct zillions of tiny parts or where they would need to do significant prep work before each public program.

- Know that the range of possibilities for how good or far along an activity concept is when you end the meeting. Sometimes there is an excellent concept with a clear plan of execution. Other times there is an OK or poorly defined concept, or a great concept with serious implementation problems (what materials could possibly work?!). In other cases you may leave with absolutely no ideas about how to move forward (this doesn't happen that often!). Regardless, it is important to assure the scientist that this is all a part of the process and explain what steps you will take to follow up and keep the process moving.

- It is important to take good notes during the meeting, particularly regarding the science content and any activity concepts. These notes will be really useful for the two facilitators if they need to revisit an idea, come up with ways to enhance it, identify materials, etc. Also, take specific notes on the following items:
    - Follow up steps that the scientist will take & follow up steps that PSC will take. Be clear and explicit! Make a list and share it.
    - Any preliminary materials that are needed.
    - Any possible exhibits shop help. Follow up on these back at PSC ASAP to confirm feasibility with scientist. Don't promise this type of help until you have confirmation from exhibits.

- For each scientist, it will be useful to designate a specific PSC staff member to follow up with the scientist on conceptual ideas and materials. Typically, there is email follow up between scientists and PSC staff regarding concept refinement, exchange of drawings or mock-up materials, materials brainstorming, etc. Sometimes there is a brainstorming phone meeting scheduled, or an additional in person meeting (usually at PSC).

- Generally speaking, each scientist is different in terms of their excitement, comfort with the process, confidence, willingness to commit to activity development time, etc. Some of the types of scientists we encounter are:
    - nervous, not confident
    - negative (half glass empty) about ideas
    - totally self sufficient
    - drawn to “flip-top” type experiences
    - wants to over-complicate
    - thoughtful and deliberate
    - worried about the complexity of their subject area (won’t let go of details)
    - needing affirmation and encouragement

About Activities

Qualities of the BEST activities:

- Relate to scientists own active work or research. Scientists are able to share the central and most important components of their work, and the things that they feel are most important to communicate.
- Are inquiry-based (not flip top style with one route to one answer).
- Offer the visitor a chance for discovery, investigation, manipulation, observation and scientific processing.
- Are open-ended. Often there are multiple solutions to discover.
- Provide an appropriate level of challenge. Too easy, and visitors are bored. Too difficult and visitors are frustrated.
- Are hands-on and invite visitor to DO something right away.
- Include multiple users (think about family groups) and can be adapted for multiple age groups.

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The activities can never cover EVERYTHING about a scientist’s research or work. They must choose one aspect or content area to focus on. The focus area differs between activities. Sometimes they are about:

- The "big question" of a scientists work research
- A basic, fundamental science content
- Research methods or processes
- Scientific thinking
- Personal science stories

Relatedly, the activities fall into different formats that suite a particular topic and meet specific visitors experience or learning goals. Typical formats are:

- Simulated "research" activity. Use replicated data sets (mock or real) so that visitors can analyze it and make conclusions/observations. These types of activities should help the visitor see the types of decisions and analysis that the scientist does in their work.
- Experiential analog of a science concept.
- Model of a phenomenon.
- Challenge activity or game.
- Authentic research materials or artifacts.

Sunset Zoo Training Workshop 1 Outline

Training for NASA at My Library Scientists: Workshop 1

Introduction (5-10 min)

- Introduce Trainers & Scientists
- Review NASA @ My Library project and expectations
- Overview of training and engagements
    - Planning today
    - Delivery next session
    - April 22nd & 29th

Designing your message (30-40 min)

- Core goal: distilling your message down to the essentials with specific audiences and goals in mind
- Introduction to audience
- Hat game: With a partner, participants alter saying "I am xxx" for a minute (I am a father, I am a husband, I am a scientist, etc.). Discover that you wear many hats!
    - Conclusion: when you engage non-expert audiences, you do not need to wear your scientist hat
- Introduction to goals
- Introduction of JAM tool: participants get 3 min for planning (JAM handout)
- Making pitches in pairs:
    - 1 min for a pitch
    - 30 sec feedback by listener
    - 30 sec for a pitch
    - 30 sec feedback by listener
    - 15 sec pitch
    - 3 min for interview (JAM handout)
    - 1 min for a pitch
    - Swap and repeat
- Debrief as a group: What worked? What didn't work? What do people take away from the experience?

Telling a story (30-40 min)

- Core goal: translating your work into a compelling story
- Group discussion: Why do we tell stories? What are the elements of a story? How do storytelling elements relate to the way conduct research (scientific process vs. hero's journey)? (Story slides)
- Overview of storytelling prompts
- Use your knowledge of the audience and your pitch to tell a story about your work: participants get 5 min for planning (hero's journey handout)
- Each scientist tells a story to the group (3 min, with 2 min feedback)
- Integrating story and engagement

Review Materials Available (15-20 min)

- Hands-on engagement
- REU Document? SoT Document?
- Introduce scientists to NAML Kits that they can lean on as a resource
- March 31 deadline for material needs for engagement and document

Wrap Up (15-20 min)

- Final questions
- Review deadlines & dates

Sunset Zoo Training Workshop 2 Outline

Training for NASA at My Library Scientists: Workshop 2

Introduction (5-10 min)

- Check in and time for questions from Workshop 1
- Making connections between Workshop 1 & Online Interpretation Training
    - Activity taking you down to your 15-second message was to help you reach a more concise goal.
    - This goal is essentially your theme, which is the terminology used in the interpretation field. Themes are one, complete sentence that focuses your engagement. Everything you do during an engagement should come back to that theme or goal.
    - This theme should connect back to your passion. This is an essential principle of interpretation. It's hard to excite people around your theme if it's not connected to your passion.
- In the Google Drive, organized with two folders. In the folder, Workshop 2, there is the POP Scientist Manual. This is to supplement the online training as well as today's workshop. As you open it and look through the manual, really focus on pages 10 and beyond. Those pages address techniques for engaging audiences, which is what we are going to touch on in our short time today.

Building a Common Vision (30-40 min)

- Core goal: Straight presentations are challenging even when we think what we're describing is simple.
- Group discussion: The programs we are planning for are virtual as everyone knows. This type of programming presents some unique challenges. One of those is being able to gauge your audience and engage directly with them. What ideas do they have to facilitate engagement/interaction between themselves and the audience during their program?
- Activity – emailed images. Go ahead and have those ready for this first activity. You also need to grab your paper and pen.
    - Activity Order – Scientist 1, Scientist 2, Scientist 3 (order in which they will connect with the library)
    - Zoo displays instructions for everyone to see.
    - Round 1 – Scientist 1
    - Discussion – What worked, what didn't work (Zoo share a Word Doc and type during discussion for everyone to see)
    - Round 2 – Scientist 2
    - Discussion – What worked, what didn't work (Zoo share a Word Doc and type during discussion for everyone to see)
    - Round 3 – Scientist 3
    - Discussion – What worked, what didn't work (Zoo share a Word Doc and type during discussion for everyone to see)
- Wrap Up Discussion – transition to next activity

Engagement through Questions (30-40 min)

- Core goal: Develop an understanding of how to effectively use of questions to guide engagement.
- Introduction
    - Last workshop – focused on message development and storytelling as a tool.
    - As indicated on page 10, audiences don't like lectures. Storytelling helps so they aren't dry and that they are more interesting, however, they aren't overly engaging in and of themselves. Thus, integrating questions in key areas and during hands on engagement can be a very powerful tool
    - Questions engage and help audiences construct understanding
- Object Interaction
    - Questioning Strategies
    - Question Sequence
    - All three together – practice engaging multiple people at once.
    - Debrief

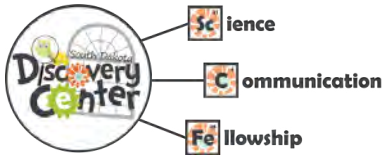
Review Tips for Virtual Engagement (10-15 min)

- Handout

Wrap Up (30 min)

- Introductions
- Overview of how events will go
- Final Thoughts

STEM Outreach Tips for Scientists



Virtual Programming Guide for Scientists

Presentation Structure

- *Engaging* introduction: (5-10 minutes)
- Intro to hands-on activity (5 minutes)
- Hands-on activity (20-30 minutes)
  - During this time, one-on-one or small group discussions with you could occur.
- Q&A with scientist (20 minutes)

Preparation is Key

- Recommend having a practice session with the library.
- Provide the librarian a suggested script for what they should cover in the introduction (name, title and location, quick overview of the agenda, who is funding the program).
- Identify supplies needed at library.
- Have a few stories/anecdotes/interesting facts ready during the Q&A portion in case there aren't questions; however, be sure to allow plenty of time for participants to come forward with questions.
- Consider "planting" some questions for the library facilitator to ask.
- Have any media (video, pictures, websites, PP, etc.) ready to go on a click. Be sure to do a test run to make sure they all work prior to the session.
- Have pen and paper or app ready to draw diagrams if needed.
- Write out the progression of your presentation with an approximate time allotment.
- Write out questions you will ask.

The Setting

- It can be hard to hear questions from the audience. Use earphones for better sound quality; it helps both library visitors to hear you and you to hear them.
- Ensure you are in front of the camera and the microphone works.
  - If possible, try to use a headset microphone. Check with your IT Dept. to see if they have one.
  - If unable to get a microphone, make every effort to speak directly into the microphone on your computer/laptop.
- Room Environment: Office, lab, or other.
  - Have a clean background. Do not sit in front of a messy whiteboard – people will read what's written there rather than listening to you! Sitting in front of a blank wall or in an uncluttered lab is best.
  - Minimize noise by closing doors, sitting in an interior room (i.e., not adjacent to a busy road), and turning off your phone.
  - Only have items needed for your presentation on your desk/table. Clear your desk of unneeded items so you are not tempted fidget with anything on it. Pick up an object only if you're showing it to the camera.

What to Wear

- Comfortable clothing in muted colors is best – avoid detailed prints, bright colors, and stark black or white. Make sure you've worn the outfit before – don't try out clothing for the first time on camera!
- Avoid clothing with closely spaced lines or dots. Clothing with very closely spaced lines or dots can exhibit a phenomenon known as the Moire effect on camera, which is when the pattern appears to move and shimmer. That's distracting!
- Avoid jewelry or accessories that are shiny, noisy, or jangly. These attributes can be highly distracting on camera.
- Check your teeth! You don't want to be wearing spinach!

What to do with hands

- Generally, keep your gestures within "the box" – an area extending from roughly your neck to your waist and not much wider than your body. If you point at something off camera, people won't know what you're referring to. Keep your gestures close in.

Language is even more important virtually

- Avoid use of field-specific jargon or other unnecessarily complicated language.
- Use metaphors/similes for describing your research.
- Use visuals, models, demonstrations, etc.

Engaging Introduction

- Who are you? Where do you work?
- What do you research? Why is that research important?
- What have you found? Was anything surprising?
- Would an image or an object help you convey your research? A (small) piece of lab equipment? An actual sample? Pictures from field or lab work?

Getting Feedback

- Ask library facilitator to be an active partner in the presentation.
    - Help getting participants' attention.
    - Bring students to microphone or camera to ask questions, demonstrate, give answers, etc.
- Use phrases such as – raise your hand if….; hold up one finger if you believe….; hold up two fingers if you think it is…. The library facilitator can assist with this as well.

Appendix D: Public Programs Documents

Event Planning Tracker

Date of Event	Time of Event	Scientist(s)	Library Partner	Audience	Demo	Scientist(s)' Location:	Confirmed with Libaries?	Marketing Materials to Library?	Materials Shipped & Staff Responsible	Test Zoom with Library on [date]:	Sent final event details to scientist and library?

Wyoming NASA Space Grant Best Practices for Virtual Programming

Best Practices for Virtual Programming

Preparation is Key - While this is true in general for STEM outreach events, we found it to be especially true when distance and technology are involved. The scientist (or their delegate) and the presentation site must do a practice session to work through any technical difficulties, and the presentation site must have the needed technology (microphone and camera) set up before the practice session. A camera at both ends is essential. A wide-angle camera and a portable microphone that could be passed from participant to participant are helpful (but not necessary). Beyond setting up technology, we found that for a full virtual visit that involved a hands-on piece, it is unquestionably helpful for the scientist and the site to prepare for the activity by working through the entire activity FIRST (a practice run) before trying it with participants. While this is a larger time commitment, it pays off huge dividends in the end.

Virtual can still mean hands-on – through trial and error, we learned ways to encourage hands-on participation of the students, even though the scientist or mathematician was not present in the classroom. This necessitated excellent preparation and planning as any supplies either needed to be sent in advance of the virtual visit OR prior planning with the teacher to ensure that needed standard supplies (paper, scissors, etc.) were available. *For example in one virtual visit with a fourth grade class, a mathematician did a mini-activity involving the Mobius strip and students had paper, scissors, and tape so they could create their own Mobius strips.*

You still need a 'hook' – With in-person activities we really emphasize the "invitation to participate" or hook with our scientists. We found this to be even more vital with virtual visits, as that in-person connection was missing. Virtually figuring out how to get the participants to actively engage is even more important. For some of our scientists this meant pre-loading participants with something to think about or a question to answer ahead of the presentation. (*For example we had a scientist who would skype with students while doing polar bear research in the arctic. He would email the teacher a picture – usually involving him and a polar bear – to the students a few days before they skyped. The presentation would then start with the students asking questions based on that picture.*) Alternately some scientists would engage students with a 'science is WOW' moment designed to grab students' attention. (*For example a scientist who for in-person visits would use heart–rate measurements of students under different conditions to talk about metabolic rate measurements found that he could hook himself up and project the live-feed onto the screen for virtual visits. He would then plunge his head into a bucket of ice-water to show how his heart rate changed. Students LOVED this.*) While the hook or invitation to participate varies based on the scientist's personality and field, it is a really important piece to develop.

Language is even more important virtually – When not face-to-face with an audience it is even more important that scientists avoid the use of field-specific jargon or other unnecessarily complicated language. With the additional barrier of distance to contend with, the use of overwhelming language would quickly disengage students from a presentation. For our scientists, this meant rehearsing activities beforehand and finding good metaphors/similes for describing their research. We emphasize that this does not mean 'dumbing down' what you do but rather finding a way to describe it in a manner accessible for your audience.

You need a way to get feedback from your audience – Many of our best face-to-face presenters are constantly making small adjustments in their presentation based on audience feedback/questions. Virtually it can be harder to gather that feedback, so we found that it is helpful to have a plan in place ahead of time to do so during the presentation. We found that having someone at the physical site to be an active partner during the presentation helped facilitate this. For us (since we were presenting in classrooms) this meant having the teacher actively participate in the presentation by getting the students' attention, polling the class to answer presenter questions (i.e. "hold up one finger if you think the answer is . . ., two fingers if you think it is . . .") and bringing students to the camera/microphone to ask questions, demonstrate, give answers, etc.

Follow-up is important – In working with K-12 classes, we found that following up with a virtual STEM visit really increased the impact it had on students. This follow up could mean a second visit or something like having the students share questions about the presentation/activity later that were passed on to the scientist. Additionally, several of our scientists who were doing field research created blogs that classes could follow after (or before) the scientists virtual visit to the classroom.

Orlando Science Center Best Practices for Virtual Programming

ORLANDO SCIENCE CENTER

Best Practices for Virtual Programming

- **Preparation is Key-** The Orlando Science Center will be setting up practice runs with each partner library ~1 week prior to the scheduled program to test the technology across both sites. We will provide spec sheets to scientists with recommendations to format/prepare for their presentations. We highly encourage each scientist to practice their presentation and activities before their scheduled program!

- **Language is even more important-** When not face-to-face with an audience it is even more important that scientists avoid the use of field-specific jargon or unnecessarily complicated language. In a virtual setting, the use of overwhelming language can quickly disengage an audience. Practice your talking points and your activities. Think about good metaphors/similes that can help describe your research without 'dumbing down' what you do.

- **You still need a 'hook'-** Get creative and think about how you can actively engage your virtual audience! This may include starting your presentation with a question for your audience to think about or engaging the audience with a 'wow' moment that grabs everyone's attention.

NASA@ My Library

NCIL National Center for Interactive Learning

SPACE SCIENCE INSTITUTE

ALA American Library Association

ORLANDO SCIENCE CENTER

Best Practices for Virtual Programming

- **Virtual can still be hands-on-** In addition to any activities or demonstrations you might chose to use for your onsite programming at the science center, the partner libraries each have activity kits from NASA that can be used to for hands-on participation at their sites.

- **Find a way to get feedback-** It can be much harder to gather audience feedback in a virtual presentation. Plan ahead and think about how you might be able to elicit those opportunities. This might include having some planned points within your presentation to ask for questions/comments.

- **Keep it simple-** Often some of the strongest presentations have simple, focused topics and minimal distractions on the screen. To minimize technical issues and buffering, avoid lengthy videos or embedded video links.

- **If all else fails, Don't Panic!** Live presentations (especially with virtual components) always have the opportunity for technical glitches and unexpected issues. Remember, the science center is here to help and will do everything we can to ensure as smooth a program as possible. Don't get discouraged if issues arise. Be flexible, stay patient, and have fun. ☺

NASA@ My Library

NCIL National Center for Interactive Learning

SPACE SCIENCE INSTITUTE

ALA American Library Association

Sunset Zoo Tips for Virtual Programs

SUNSET ZOO
www.sunsetzoo.com

Tips for Virtual Programs

1. Be Brief

Audiences begin to lose attention after roughly 10 minutes of hearing from the same presenter. If you have more than 10 minutes of content, use interactive activities to keep your audience engaged (for example, take a poll, give quizzes, or ask audience members for their opinions via chat).

2. Be Simple

Keep slides simple — avoid too many words, graphics and animation features. Less is definitely more!

Light yourself well | Illustration by Tricia Seibold

3. Be a TV Personality

Look straight into your camera, not the screen. Wear clothing that is neutral in color (no plaids or stripes). Light yourself well and from above. Be mindful of what appears behind you in the background. Invest in a good microphone.

4. Be Standing

Even though your audience cannot see you, stand when you present. This allows you to stay focused and use good presentation delivery skills such as belly breathing, vocal variety, and pausing.

5. Be Prepared

Practice delivering your presentation with your technology in advance of your talk. Make sure all of the features of the technology work. Record your practice using the recording feature of your tool. Watch and listen to learn what works and what you can improve.

6. Be Assisted

Have someone available to deal with technical issues and to field email/text questions. Also, if you have multiple remote audience members in one location, be sure to pick one of them to be your "eyes and ears." Ask them to queue up questions and facilitate discussion on your behalf.

7. Be Specific

Ask pointed questions to avoid too many people answering at once. For example, rather than ask, "Are there any questions?" try "Who has a question about the solution I provided?" Set a ground rule that people state their names prior to speaking.

Imagine your audience | Illustration by Tricia Seibold

8. Be Synchronized

Transitions are critical. You must connect what you just said to what is coming next when you move from point to point. Transitions between topics and slides are good opportunities to get people reengaged to your talk.

9. Be Connected

Imagine your audience even though you can't see them. You can place pictures of audience members behind your camera so you can look at people as you present.

10. Be Early

Encourage your audience to access your call or webinar in advance of the start time so you can iron out any technical issues in advance and get them familiar with the technology.

These tips are from Stanford Graduate School of Business, written by Matt Abrahams on September 26, 2016

https://www.gsb.stanford.edu/insights/10-tips-giving-effective-virtual-presentations

Matt Abrahams is a Stanford GSB organizational behavior lecturer, author, and communications coach.

Appendix E: Evaluation

Executive Summary of Phase II Evaluation

NASA@ My Library: A National STEM Program Building Connections Between NASA Science Missions and Public Libraries (NNX16AE30A)

PoPNet Phase II Evaluation Findings

May 2019

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EDC Education Development Center

Executive Summary

As part of the NASA@ My Library program, EDC evaluated Phase II of the Portal to the Public Network (PoPNet) effort between October 2018 and May 2019. The PoPNet leadership team at Pacific Science Center supported six PoPNet sites as they recruited and trained scientists to present virtually at *NASA@ My Library* libraries in their region. This model was originally piloted at two PoPNet sites that completed activities in May 2018. In the second phase, five PoPNet sites each prepared four or five scientists (for a total of 22 scientists) and arranged 29 programs at 15 different *NASA@ My Library* partner libraries. One PoPNet sites experienced challenges recruiting scientists and scheduling programs with libraries and decided to terminate their contract early.

Evaluation activities included surveys of PoPNet site representatives, scientists, librarians, and patrons as well as "virtual" site visits (where an evaluator joined the online meeting to observe six programs), interviews with a sample of librarians, and review of other project documents.

Experience of PoPNet Sites

- PoPNet sites had been interested in offering virtual programming as part of their outreach efforts.
- Most representatives were satisfied with the support offered by the PoPNet hub at Pacific Science Center.
- Recruiting NASA-affiliated scientists to participate was challenging for PoPNet sites. Two representatives thought their training of scientists was only "Slightly successful."
- PoPNet representatives had mixed success in scheduling programs with librarians, a challenge that was increased due to the short timeframe of the project, with the original timeline asking PoPNet sites to complete activities within six months. (Libraries often plan programs up to six months in advance.)
- Almost all PoPNet representatives indicated they were very likely to continue to do the work they began under this project—especially continuing to work with libraries. A PoPNet representative reported that the project allowed the informal science institution to try virtual programming and increase their reach, and they are already considering how to expand on these efforts.

Feedback from Scientists

- Twelve out of thirteen scientists who completed the follow-up survey agreed or strongly agreed they were satisfied with the training they received from their PoPNet site.
- The assistance and practice on how to talk about their work in an accessible, engaging way was especially valuable, and all scientists agreed that they felt prepared to talk to a public audience about their job. In addition, librarians all agreed that the scientists seemed well prepared and that the content of the presentation was appropriate for both the format and the audience.
- Topics of presentations included identifying new planets, categorizing galaxies, turning waste into energy, phytoplankton and nano-particles. While most scientists were able to successfully

integrate hands-on activities that were connected to their work, a few used kit activities that were not closely related or activities that were not as engaging for the audience.

- Twelve out of thirteen scientists who completed the follow-up survey were interested in doing more public outreach and to continue to develop skills for engaging an audience in STEM and eleven scientists would like to participate in future *NASA@ My Library* programs.

Experience of Librarians

- All ten library staff who responded to the survey were satisfied with the level of control that they had in planning their programs, even though it was usually fairly minimal. Librarians appreciated that PoPNet was responsible for finding and training scientists. Librarians were more than willing to put in the time to set up and test the virtual connection and to market the program to their patrons.
- Many librarians would like the programs to be scheduled further in advance. They also wanted to have more detailed information about the program to help them advertise and feel prepared to help facilitate any activities.
- Librarians who were able to connect with the scientist prior to the program felt it was useful for both parties: librarians furthered their understanding of the program and the scientist gained insight into the potential audience and could share tips for how the librarian could help facilitate the activity.
- Three out of ten librarians indicated they used *NASA@ My Library* resources, activities, or materials and that they had a positive experience.
- Librarians appreciated having an expert presenter who could explain the content and address patrons' questions.
- All librarians agreed that working with PoPNet was a positive experience and that they would recommend that other *NASA@ My Library* project libraries work with PoPNet sites.
- Librarians all agreed that they felt more comfortable offering STEM programming, were more aware of how to include a scientist in a program, and felt more comfortable offering programs with a virtual connection to a scientist.

Patron Engagement and Outcomes

- Known attendance at programs ranged from four to 30 people, with an average of 13. Six out of ten librarians were not satisfied with the number of attendees at their recent NaML PoPNet program. Future strategies to help boost attendance included scheduling further in advance to allow more time to advertise the program, clarifying responsibilities for marketing efforts, and receiving assistance from PoPNet or the scientist on framing the presentation.
- Patrons attending the programs were most commonly in Grade 6-8 (37%) or Grade K-5 (29%), white (55%), and female (59%) (according to patron survey responses).
- Librarians felt the content of the PoPNet program was a good fit for the patrons who attended.
- Patrons almost all agreed that the PoPNet programs were interesting and engaging (only 1% indicated "Disagree").
- The majority of librarians and scientists agreed there was a connection between the scientist and the audience despite not being in the same physical space.

- Many patrons shared that they liked being able to have access to people who they would not typically be able to connect with and that they enjoyed being able to talk to and ask questions of "professionals" or "experts."
- Over 90% of patrons indicated they learned a lot at their NaML PoPNet program and that the program made them want to learn more about Earth science, space science, or engineering. Eighty-three percent of patrons agreed that the program made them want to look for more information about NASA science or careers.

Overall

- There was a high level of agreement among librarians, PoPNet representatives, and scientists that the programs were successful.
- Scientists were particularly satisfied with the high level of engagement of the audience, with that being the most common response to an open-ended item on what worked well; all 13 survey respondents indicated that the audience engagement was "Moderately successful" or "Very successful."
- Most librarians praised the programs for the hands-on and more interactive portions, including how they effectively engaged different age groups.
- Programs used a variety of formats, including a live stream of an in-person presentation by scientists and programs featuring multiple virtual connections to scientists leading activities.
- Benefits to the virtual presentations, according to scientists and librarians, were reaching a broader audience (usually more rural populations) without travel time or funding, more flexibility in scheduling, and more scientists available to "visit" their library. Scientists were not necessarily willing or able to travel, so they also appreciated being able to reach an audience that was not frequently exposed to scientists.
- Many librarians had not been able to arrange a visit by a scientist to their library, so even though most felt that in-person visits by scientists would be preferable, they also all strongly felt that a virtual visit was much better than no visit at all. A few librarians felt the audience may have been more hesitant to ask questions or interact with the scientist over the virtual connection.
- Technical difficulties were commonly experienced during the NaML PoPNet programs (identified by 10 out of 13 scientists), though to various degrees: poor or intermittent audio or video connections interfered more with the program, but other difficulties such as having a poor internet connection, poor video quality, inadequate lighting, or poor audio also diluted the quality of the programs.

Recommendations and Summary

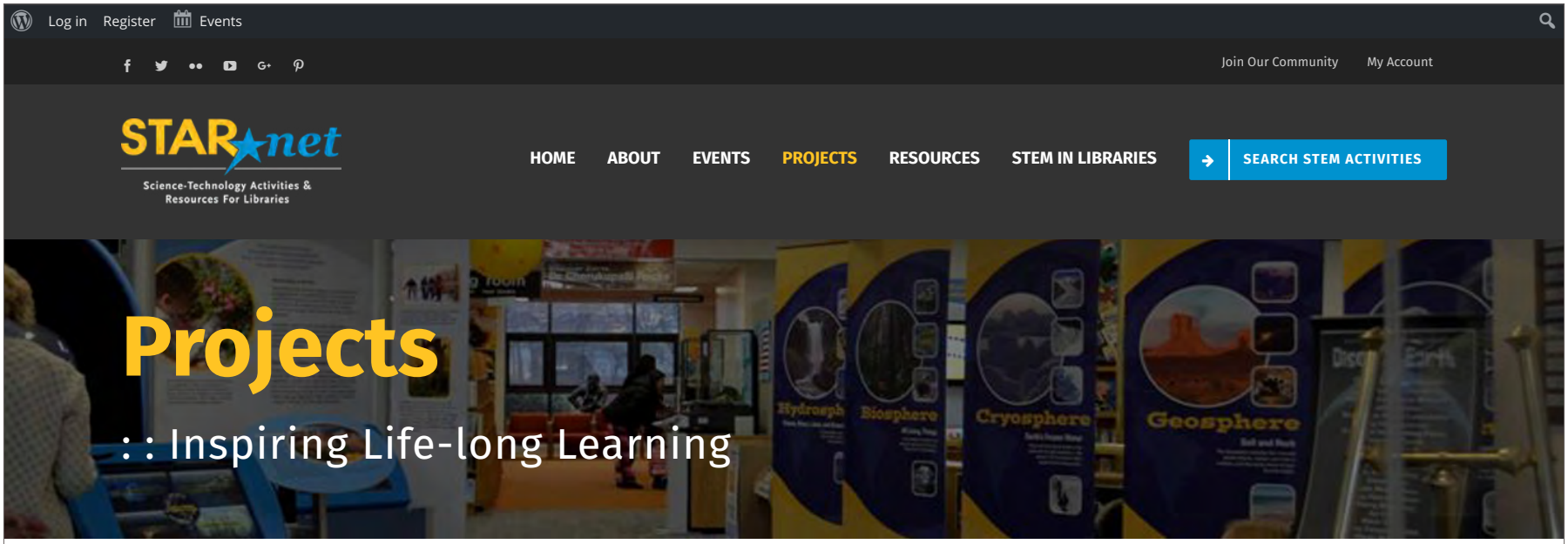
Overall, the PoPNet model of connecting NaML partner libraries to trained scientists who provided virtual learning experiences for library patrons was a positive experience for PoPNet sites, scientists, librarians, and patrons.

The report includes suggestions based on the data gathered for this evaluation, including allowing more time for the project implementation (especially more time to schedule programs with libraries), more standardization of programs based on what is found to be working (including specifications for technology equipment), and providing assistance to librarians to help market the programs.

The report also highlights the successes and benefits of these programs, including well-regarded trainings of the scientists by PoPNet sites, gains by librarians in their comfort offering similar programming with a scientist and with virtual connections, and the high engagement and positive feedback from patrons on their experiences at NaML PoPNet programs.

Appendix F: Other Links

NASA@ My Library Website



NASA@ My Library

A National Earth and Space Science Initiative That Connects NASA, Public Libraries and Their Communities

NASA Science Mission Directorate education objectives support the Nation's education efforts to improve science literacy and to inspire the next generation of scientists and engineers. One institution that can accomplish both of these outcomes, for people of all ages and in every region of the country, is our public library system – the central focus of the *NASA@ My Library* project.

Project Vision

Through the *NASA@ My Library* project, NASA and the public library community will work together to enhance

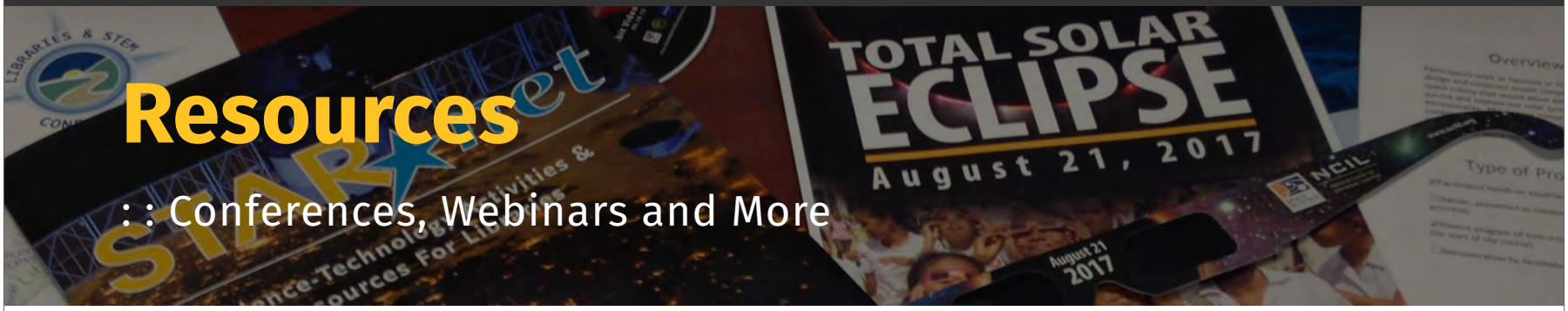
STAR Net STEM Kits

Log in Register Events

Join Our Community My Account

STAR net
Science-Technology Activities & Resources For Libraries

HOME ABOUT EVENTS PROJECTS RESOURCES STEM IN LIBRARIES SEARCH STEM ACTIVITIES



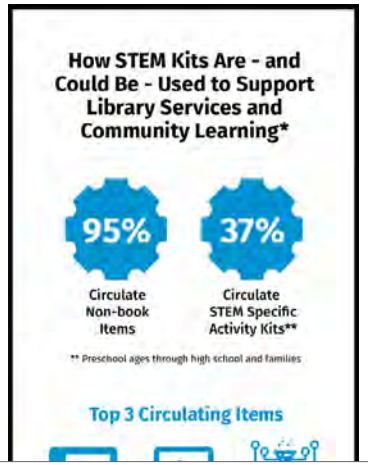
Resources

: : Conferences, Webinars and More

STEM Kits

Libraries across the country are utilizing facilitation kits to provide more structure to their programming plans, and check-out kits to help their patrons take the experience home. Whether you've never used a kit before, or consider yourself a kit pro, these resources will provide you with prototyped and tested activities and resources to use with your patrons.

Click into the topic areas below to see examples and resources from the *STAR Library Network*, State Libraries, and other *STAR Net* project partners. We hope this area addresses everything you need to know to get started with kits, but if you think we're missing anything, let us know!



Digital Science Games

Portal to the Public Implementation Manual and Catalog of Professional Development Elements