

Summer Space^{of}

Celebrating 60 Years
of Space Exploration

A stylized orange planet with a white ring system, surrounded by several small orange stars of varying sizes.

Final Report April 2020

A vibrant space scene featuring a purple and blue nebula background. Several planets are visible, including a large orange planet with rings, a blue planet, and a smaller blue planet. White orbital paths curve across the scene.

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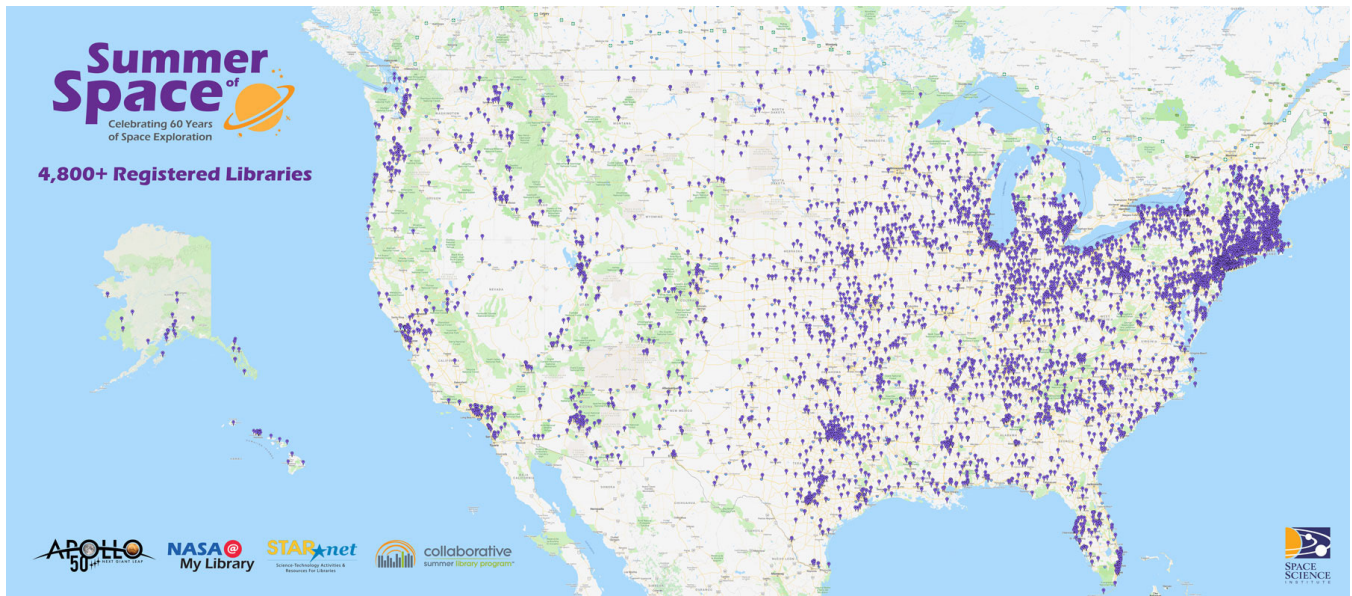
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1. Introduction



2019 Summer of Space Reach Map

The Space Science Institute's (SSI) National Center for Interactive Learning (NCIL) manages the STAR Library Network (*STAR Net*) and its *NASA@ My Library* program. The *STAR Net* team in partnership with the Collaborative Summer Library Program (CSLP) worked together to share science- and technology-related activities and resources with libraries across the nation as part of CSLP's 2019 summer learning theme. The slogan "A Universe of Stories" was chosen by library professionals to help inspire children of all ages to dream big, believe in themselves, and create their own story. It coincided with NASA's celebration of the 50th anniversary of the Apollo 11 Moon landing. *STAR Net's Summer of Space (SoS)* campaign was chosen to serve both NASA and CSLP interests and can be used as a template for future summer events. The SoS webpage included numerous STEM resources that libraries utilized in their celebration of space exploration such as a collection of vetted STEM

activities, giveaways, partnership opportunities, media templates, printables, and a collection of spectacular images and videos.



The [Collaborative Summer Library Program \(CSLP\)](#) is a consortium of states and island nations working together to provide libraries across the country with a shared summer reading theme and supporting materials. These materials include professional artwork, themed promotional items, activities and evidence-based instruction manuals targeting prereaders, children, teens and adults. Each year 16,000 public libraries participate in the program and host summer learning programs based on materials developed by CSLP and its partners (e.g. *STAR Net*).



Credit: Borrego Springs Library

Librarians from across the country volunteer their time and talents to make the program successful. To ensure that the needs of its member libraries are considered, each state designates a representative to CSLP. This representative is usually the state's Youth Services Consultant, the individual responsible for distributing State and Federal funding to support library services in their state. CSLP provides an avenue for each member State to play an active role in the development of the resources, materials, slogans and themes they use to foster summer reading and hands-on learning in their local libraries. For the summer of 2019 event, *STAR Net* and CSLP created a series of Summer Learning Champion Videos (6) that were used by libraries, local schools, and shared on social media. These videos and other details about the CSLP partnership are described in Section 3, "Resources for Libraries."

Scholastic Publishing and [Haptically Speaking](#) were also key partners in the overall reach of *Summer of Space*. The partnership with Scholastic provided the *STAR Net* team with a donation of over 800 space related children's books that were distributed to libraries who registered as incentives

and prizes. Included in those prizes were [Getting a Feel for Lunar Craters](#), a braille book for visually impaired readers that was produced by Haptically Speaking and funded by NASA. These relationships were important for the success of *Summer of Space*, increasing the impact on diverse learners STEM engagement can have across the country. See Section 3 for more details.

Reach

More than 4,800 public libraries were supported and participated in *Summer of Space* activities (see map on Page 1). The resources, activities, and giveaways provided to libraries empowered staff to showcase space related content in a fun, educational, yet easy to understand way that kept patrons interested and engaged throughout the summer.

"We had a wonderful summer using the NASA resources. The children and adults learned much from our summer in space. One child said, "I really think I will be an astro-engineer someday and work on the space station because of being at the library."

-Kim King, Priestly Forsyth Memorial Library, Pennsylvania

By connecting CSLP's theme of "A Universe of Stories" to the Apollo 50th Anniversary and *STAR Net's* International Space Station Education Downlink at the Slover Library in Virginia, 2019 was an opportunity for libraries to create a summer learning program dedicated to space science, technology, engineering, and mathematics. Many libraries were able to expand their STEM programming beyond their normal activities with some engaging with STEM for the first time. With all 50 states represented, *Summer of Space* made a national impact on participating libraries and their communities.



Credit: Fort Meade Public Library

Campaign Goal

As part of *STAR Net's NASA@ My Library* project, public libraries and state library agencies worked with the project team and NASA 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. The major goal of this event was to provide libraries with the needed resources and program ideas to engage their community with relevant and timely space-science themed programming.

Past Events

The *Summer of Space* campaign was influenced by *NASA@ My Library's 2017 eclipse event*, which provided over 2.1 million free solar viewing glasses to more than 7,000 individual library locations that included public library branches, bookmobiles, tribal libraries, library consortia, and state libraries. The eclipse event included in-person and online training, webinars, an Eclipse Education Kit, and [eclipse guide](#). These materials were highlighted on an event page on the www.starnetlibraries.org site.

The 2017 eclipse provided a useful and timesaving template for building a successful program. The 2017 registration strategy was reused for the summer 2019 event, more activities were collected and vetted, and subject matter expert relationships were continued and built upon.

NASA@ My Library also provides support for smaller events such as Earth Day, Engineering Week, International Observe the Moon night, and others. More information about events can be found at www.starnetlibraries.org/upcoming-events. See Section 7 for more information about *STAR Net* and *NASA@ My Library*.

2. Summer of Space Events

Several key events during the summer helped to enrich what libraries were already planning to do for their space-themed summer programs. The three largest events that libraries participated in (and provided report information on) were the 1) Apollo 11 Re-enactment with the American Museum of Natural History (AMNH) in partnership with *STAR Net*, 2) NASA's 50th Anniversary Live Event, and 3) the NASA In-Flight Education Downlink with the International Space Station at the Slover Library in Norfolk, Virginia.



Apollo 11 Re-enactment event. Credit: AMNH

The **Apollo 11 Re-enactment** event on July 15, 2019 was hosted by Carter Emmart of the American Museum of Natural History. It used OpenSpace 3D graphic technology to simulate the launch of Apollo 11 from Kennedy Space Center, its orbit around Earth, the touchdown of the Eagle lander and the subsequent return of the astronauts to Earth. The event was live streamed on YouTube, an accessible platform for libraries to share with their patrons. Libraries hosted programs to coincide with the re-enactment, involving hands-on activities and subject matter experts (For example, Solar System Ambassadors, NASA employees, and university employees).

Along with the Re-enactment, **NASA's 50th Anniversary Live** event provided ample opportunities for libraries to tune in via YouTube live streaming, generating programs around NASA's past and future missions. One such event on July 19, 2019 provided libraries access to the Apollo missions through the eyes of those who were a part of it. This event included the live NASA broadcast that told the story of how we got to the Moon, and how we'll get there again, hearing directly from Apollo astronauts alongside current and future astronauts, scientists, engineers, and others sharing some untold stories, quirky facts, and personal reflections about journeying to the lunar surface.

"We had such a great summer this year in Wapakoneta, Ohio, hometown of Neil Armstrong, during the 50th anniversary of the moon landing! All things space and moon-related were extremely popular in our library. We were thrilled that so many resources were available to us and how perfectly it fit into our own town and county's celebration. From Space Camp cadets to Black Hole dioramas to telescopes set up in the parking lot, it was truly a brilliant summer!"

- Kristine Spyker, Auglaize County Public District Library System



NASA Downlink at the Slover Library. Credit: L. Todd Spencer

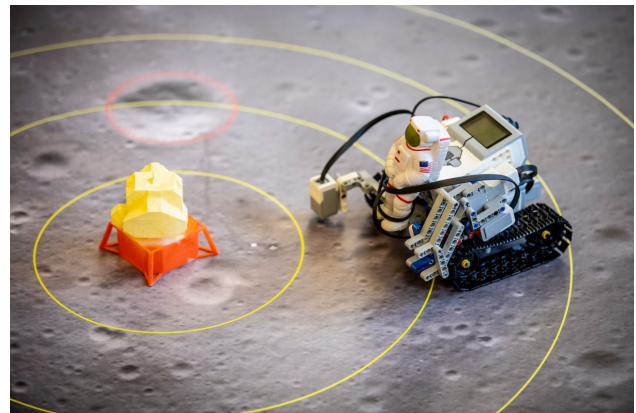
The last large summer 2019 event was the **In-flight Education Downlink** with the International Space Station (ISS), at Slover Library in Norfolk, VA on August 9, 2019. The nationally broadcast downlink event included a 20-minute time period when astronaut Nick Hague communicated live with approximately 200 young space enthusiasts at the library. This occasion allowed library patrons to ask questions presented from the Slover Library as well as questions submitted by libraries across the country.

A major goal for this event was to inspire youth and adults about human space exploration. Participants learned that astronauts have many different skills and work in teams. They are problem solvers and critical thinkers. Being an astronaut or working in the sciences is possible for anyone who has the interest, passion, and tenacity to keep trying. Patrons from across the U.S. also learned about the important role that the International Space Station serves as a steppingstone to human exploration on the Moon and on Mars, and why and how NASA scientists and engineers explore our Universe.

After the downlink event was over, local youth and adults at Slover participated in a series of space-related, hands-on STEM activities conducted by staff from the library, Langley Research Center, Old Dominion University (ODU), and Virginia Space Grant Consortium. Other participating libraries offered their own STEM programs. A [summary video](#) of the Slover event was produced by the City of Norfolk.

Finally, in addition to activities led by the *STAR Net* team, partners from NASA's Science Mission Directorate also developed programs in connection with NASA's celebration of the 50th Anniversary of Apollo 11. One program geared toward schools, after-school programs, and public libraries and schools alike was the ANGLEs (Apollo Next Giant Leap Student) Challenge. ANGLEs invited teams from fifth grade to high school seniors to build a replica of the lunar lander and use a remote-controlled Blue Heron drone to land it on an 8-by-12-foot map of the Moon's surface.

Led by Dr. Robert Winglee (University of Washington), student teams modified and programmed a Lego Mindstorms EV3 robot to explore the lunar surface and bring back a rock sample within a specified length of time. The winning teams, selected from hundreds across the nation, won an all-expense paid trip to NASA's Johnson Space Center in Houston, Texas, including a tour of Apollo's newly refurbished mission control room.



Lego Mindstorm EV3 exploring Moon Map. Credit: ANGLEs

These events and programs gave libraries the opportunity to share the story, the science, and the adventure of NASA's missions with patrons of all ages. It offered younger generations a chance to experience the Apollo 11 Moon landing through the eyes of their elders, to connect and discuss past events, and how they have impacted the present. It also gave patrons a chance to interact and participate in programs that they may not have had access to without *NASA@ My Library* and CSLP support.

3. Resources for Libraries



Summer of Space homepage

Summer of Space Website

The development of the *Summer of Space* website was crucial to disseminating the valuable resources to a wide audience. Hosted through *STAR Net's* main website, the *Summer of Space* landing page featured links to the CSLP page to learn more about the "Universe of Stories" summer learning program, the "Universe of Stories" collection in *STAR Net's* STEM Activity Clearinghouse, the Summer Learning Champion Videos, as well as hundreds of programming specific resources. Among those featured were connections to NASA's Solar System Ambassador program and the Night Sky Network – providing libraries with the opportunity to connect to NASA-trained volunteers. These resources are described below.

Media templates and resources were developed to help libraries promote their *Summer of Space* programs. These included a Press Release, Public Service Announcement, Social Media Guide, and Community Letter. Figure 1 in Section 1 was also updated monthly, letting libraries know which libraries had registered, and encouraging them

to establish a community of practice. NASA print-ready materials and other NASA specific resources were curated through this site – an easy, direct point for libraries to access.

Subject Matter Experts

The resources and opportunities to access NASA-funded and NASA-affiliated subject matter experts was a main focus of this event. Through our network and connections to Solar System Ambassadors, the Night Sky Network, and NASA Center employees, over 1500 interactions occurred with subject matter experts this summer. Library staff were able to engage with NASA subject matter experts as well as many from their local communities including Universities, Science/ Education organization, and schools.



Credit: Alaska State Library

“We had over 75 people attend our stargazing party, led by our NASA Ambassador, Jim Head. For our small library, that was HUGE! So many people thanked us for doing this program. As a result, a new astronomy club is being created in Rhinelander and the surrounding area.”

- Cindy Weddle, Rhinelander District Library, Wisconsin

Encouraged to build these partnerships, libraries now have a resource for future programming.

“We were extremely pleased to host Chet Bart from the Solar System Ambassador program for our Sky Viewing event. He did such an amazing job of sharing his vast knowledge of space during his presentation. Our patrons then had the chance to see Jupiter through his telescope and it was the first time that some of our patrons had ever looked through a telescope. It was an amazing and truly memorable experience for all of us!”

- Terra Baldus, Nezperce Community Library, Idaho

Giveaways

In partnership with Scholastic, the *Summer of Space* team was able to provide over 800 books as giveaways throughout the summer. Titles included *The Astronaut Who Painted the Moon*, *Fly Guys*, and *The Luciana Vega Series*. These titles were used for registration, newsletter engagement, and survey responses. Many of the giveaways were

gone within 48 hours, with several members of library staff thanking us for providing books that they had their eye on, but no budget to purchase. Because of the relationship established with Scholastic, Erin Teagan, the author of the *Luciana Vega* series hosted a book signing at NASA's booth at the American Library Association Conference in Washington D.C. in June 2019. In addition, 7 Orion StarBlast telescopes were raffled off as part of our giveaway plans, providing libraries with big ticket tools that they could use for future programming.



Apollo 50th Anniversary Tactile Book. Credit: NASA

Supporting Visually Impaired Audiences

Reaching underserved and underrepresented audiences was an important goal for the *Summer of Space* campaign. One population that we targeted were people who were visually impaired. With support from NASA, *STAR Net* was able to distribute the *Getting a Feel for Lunar Craters: Apollo 50th Commemorative Edition* tactile book to 1,700 libraries across the country. These giveaways provided tools to create interactions that many libraries, especially in rural areas, did not have access to. Many libraries stressed that without access to these resources their programming would not have had as meaningful an impact in their communities. Finally, the books were also distributed to most state library agencies to use in their outreach efforts.

The tactile book we distributed was produced by Edinboro University of Pennsylvania, the College

of Charleston and Haptically Speaking. They have worked with NASA, the National Federation of the Blind (NFB), teachers and parents to provide earth and space science resources accessible for those who are blind or visually impaired. This team has produced the following tactile books in Braille Ready Format: *Getting a Feel for Eclipses*, *Mars Exploration*, *Getting a Feel for Lunar Craters*, *Understanding Small Worlds in the Solar System*, *Abre Tus Sentidos a los Eclipses: Sudamerica*, and the *Apollo Commemorative Edition* mentioned previously. The 'QR' code on the front of each book links directly to the accessible online text / guide that provides background information and descriptions of the tactile figures.

With support from NASA, *STAR Net* was able to distribute the [*Getting a Feel for Lunar Craters: Apollo 50th Commemorative Edition*](#) tactile book to 1,700 libraries across the country. These giveaways provided tools to create interactions that many libraries, especially in rural areas, did not have access to. Many libraries stressed that without access to these resources their programming would not have had as meaningful an impact in their communities. Finally, the books were also distributed to most state library agencies to use in their outreach efforts.



Credit: Fairfield Public Library, Woods Branch

STEM Activity Clearinghouse

STAR Net's [STEM Activity Clearinghouse](#) was developed to offer libraries high quality and vetted hands-on space science activities. It is seen as a trusted resource for activities that have been proven to work in libraries and is a direct response

to librarians finding inaccurate materials across the web. This valuable source gives library professionals a centralized location to find free, library-friendly STEM activities from trusted sources. Users can search by audience, content level, and difficulty, among other search categories. They can also browse collections that have been curated for specific themes and events, such as the *Summer of Space* campaign. Almost all the activities in the Clearinghouse have pictures or videos of library staff doing these activities. This helps library staff to build their confidence and create better programs for their patrons. Activities developed outside the *STAR Net* project include tips and tricks for implementing in a library, and link back to the original source content for libraries to better understand and explore the content.

For the *Summer of Space* campaign, this included activities developed by *STAR Net*, NASA's Jet Propulsion lab, the Lunar and Planetary Institute, as well as the Science Museum of Minnesota and NASA's Space Place. Activities covered topics such as measuring the distance between planets, how scientists categorize our universe, the constellations and star mapping, and engineering design challenges around areas such as the lunar module. The Clearinghouse also included an "Add a Tech Twist" notation, through which the project team makes recommendations on ways that high-tech STEM tools (such as a digital microscope or voltmeter) can be integrated into hands-on activities. This resource empowers libraries to explore space themed STEM content in a way that is easy to understand and no longer intimidating.

Thanks in large part to the *Summer of Space* campaign, The *NASA@ My Library* team uploaded hundreds of STEAM activities from NASA and other vetted sources to the Clearinghouse, bringing its total number up to 394. In addition, they consulted with analytical data and user feedback to add new features in order to increase the Clearinghouse's overall usability. These actions saw a 372% increase in the number of users and a 358% increase in the number of pageviews when compared to the previous calendar year, providing evidence of the Clearinghouse's value to libraries across the country.

Summer Learning Champion Videos

To help inspire children, *STAR Net* and CSLP asked 6 leaders in space exploration and astronomy and a children's book author to be **Summer Learning Champions**. Each Champion recorded a short HD video (90 – 120 seconds) introducing themselves and what they do, how public libraries have inspired them, and then closed with the following statement: "So remember to visit your local library this summer - they have a "Universe of Stories" waiting there just for you!"

These videos were used by public libraries to encourage children to participate in summer learning programs that included many hands-on science and engineering activities (e.g., Moon observations, building and launching rockets, designing a Mars colony, training like an astronaut, robotics). They were also shown in schools, shared on social media, and used in library promotion and STEAM programs to inspire youth and adults to participate in space science related activities during the summer and afterwards.

Below is a list of who participated in the Summer Learning Champion Video Series.



Erin Teagan: Author - Luciana Vega Book Series



Dr. Michelle Thaller: Asst. Director, Communications - NASA GSFC



Dr. Kjell Lindgren: NASA Astronaut



Dr. Seth Shostak: Senior Astronomer - SETI Institute



Dr. Lindy Elkins-Tanton: Planetary Scientist & Professor - ASU



Arika Egan: Grad. Student Astrophysical & Planetary Sciences - UCB

4. Promotion

Campaign Newsletter

Libraries that registered for the *Summer of Space* campaign received a monthly newsletter highlighting new resources that were added to the campaign website, links to different activities in the “Universe of Stories” Clearinghouse collection, or directions on registering for various giveaways. This newsletter was an essential tool for dissemination of resources to the *STAR Net* community. While *STAR Net* publishes its own newsletter monthly with a broad range of STEM topics, the *Summer of Space* newsletter provided library registrants tailored resources and event opportunities. This tool helped libraries develop an effective and successful summer learning program. Highlighting specific activities increased traffic to the Clearinghouse, and helped promote how libraries can take advantage of its many features.

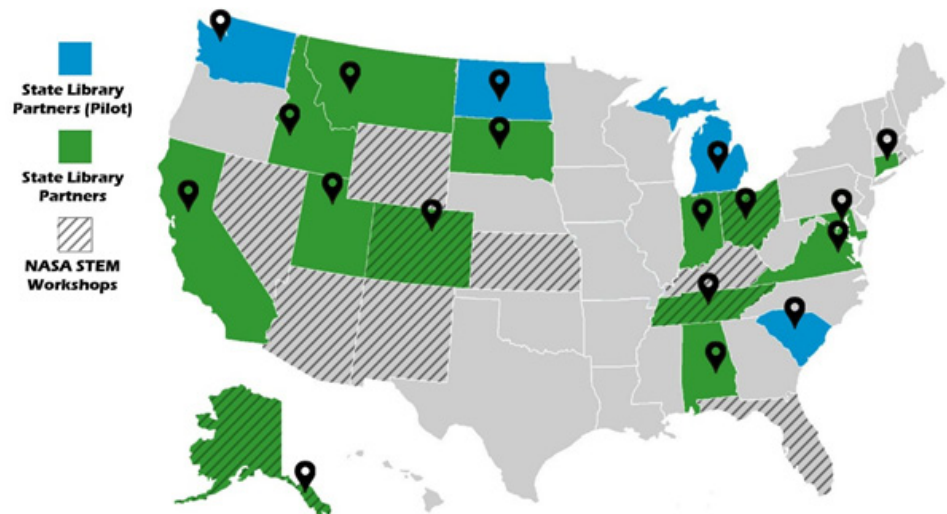
State Library Partners

NASA@ My Library's State Library Partners (18 states) were invited to share the *Summer of Space* resources and program opportunities with libraries in their state. Without their help, it is easy to assume the event would not have garnered as many registrations as it did. Timothy Cherubini, Executive Director, Chief Officers of State Library Agencies (COSLA), was

also a tremendous help. His organization was able to reach all state libraries with information about the campaign. Through the use of promotional flyers, the links to the *Summer of Space* website, and engagement at the state level, state libraries were the turning point in encouraging more public libraries to register than during the 2017 eclipse.

Outside Partners

Finally, the *STAR Net* team sent information to several of our external partners in order to reach other libraries not connected to the resources above. By working with WebJunction, a project that builds the knowledge, skills and confidence of library staff to power strong libraries, the Urban Libraries Council (ULC), and the Young Adult Library Services Association (YALSA), the *Summer of Space* campaign reached a vast number of library staff, increasing registrations and in turn increased engagement with America’s library network.



5. Preparing Libraries for Summer of Space

With several space-science themed events happening during the summer of 2019, *STAR Net* and its *NASA@ My Library* program began preparation in mid-2018 to develop resources, activities, and training to help public libraries develop an effective summer learning program in 2019. Knowing that many libraries who had not previously participated *STAR Net* programming would be joining this event, it was imperative that library staff felt prepared and empowered to facilitate quality STEM programming. Through the use of webinars, in-person workshops, and a strong website design, libraries were provided access to all the resources they needed to create exemplary programming.

Webinars and STEM Activities

From November 2018 to October 2019, the *NASA@ My Library* team, facilitated a total of ten webinars highlighting NASA educational resources and events. These webinars were open to all public

libraries and focused specifically on the *Summer of Space* event and how libraries could bring space related programming and activities to their libraries. These webinars covered a wide range of space focused topics, revolving around one common theme: empowering library professionals to feel confident facilitating space science programming.

Measured by both live and archived/recorded views seen in the table below, the *Summer of Space/Universe of Stories* webinars were some of the most highly viewed in *STAR Net's* history. Webinars continue to be a pivotal training tool for *STAR Net* to help disseminate NASA educational resources and events to library staff across the country. Libraries that serve underserved and underrepresented communities do not often have the same access to in-person training, so this virtual, free platform helps make NASA resources and knowledge accessible to all.

Date	Title	Presenters	Live Attendance	Recorded Views
9/26/18	Out-of-this-World Engineering	Brooks Mitchell, Keliann LaConte, Anne Holland	73	246
10/23/18	Bringing a Universe of Stories to Your Library	Brooks Mitchell, Luke Kralik	124	964
12/18/19	Resource Overview for Universe of Stories	Brooks Mitchell, Anne Holland	48	421
1/18/19	Craft, Engineer, and Make and Take for Universe of Stories	Brooks Mitchell, Keliann LaConte	304	335
1/23/19	Infiniscope and STAR Net	Jessica Swann, Anne Holland, Brooks Mitchell	18	58
2/20/19	Planning a Night Sky Viewing	Brooks Mitchell, Keliann LaConte	116	135
3/7/19	Solar System Scale Activities for Universe of Stories	Brooks Mitchell, Claire Ratcliffe	116	148
4/23/19	Exploring Lunar Phases	Claire Ratcliffe, Keliann LaConte, Christine Shupla	67	62
4/30/19	Community Dialogues for Summer and Beyond	Anne Holland, Jennifer Hampton, Stephanie Vierow-Fields	51	37
5/2/19	Mars in May	Brooks Mitchell, Claire Ratcliffe	90	43



Credit: New Mexico Workshop, NASA@ My Library

Workshops

The *STAR Net* team led numerous in-person trainings through the *NASA@ My Library* project that gave library professionals an in-depth look at STEM facilitation techniques and NASA resources. Facilitators (from both the Space Science Institute and the Lunar and Planetary Institute) led NASA STEM Workshops in 12 different states that reached 363 library professionals (from December 2018 – May 2019). In addition, the *NASA@ My Library* team provided in-person training to library professionals at the American Library Association Conference, Arizona Young Adult Summit, Association of Rural and Small Libraries Conference, Association of Science and Technology Centers Conference, Mountain Plain Library Association Conference, New Mexico Library Association Conference, and the Young Adult Library Services Symposium.

Besides the NASA STEM Workshops, *STAR Net*'s Paul Dusenbery and Stephanie Vierow-Fields, along with CSLP's Luke Kralik hosted a workshop at the ALA Midwinter Meeting held in Seattle, Washington (January 2019). Participants were mostly state library staff, along with representatives from the Seattle Public Library and DC Public Library. It focused on preparing libraries for Summer of Space/Universe of Stories programs. A sampling of activities from *STAR Net*'s STEM Activity Clearinghouse were offered, as well as an overview of the various NASA related resources libraries could access through the *Summer of Space* webpage. These included links to the Night Sky Network and Solar System Ambassadors as well as the [Summer Champion videos](#). Dr. Robert Winglee (University of Washington), director of the ANGLEs Challenge, also presented about his upcoming challenge for students along with a representative from WebJunction who shared resources that are available to state and public libraries.



Credit: Summer of Space Workshop, Seattle Public Library

6. Survey Results

At the conclusion of the event (August 2019), we distributed a survey to all libraries registered libraries in order to understand how our resources, connections, and overall programming were utilized. Of the 4,800 libraries, we received 983 responses – a 21% return rate. This was comparable to the response to a similar survey for the 2017 eclipse event.

The 12-question survey took an average of 7 minutes to complete with questions focused on demographics, number of programs held and program attendance, involvement with CSLP’s summer learning program, and subject matter expert engagement. This section is organized by the information requested in the survey with sampling of responses through graphs, quotations, and tables.

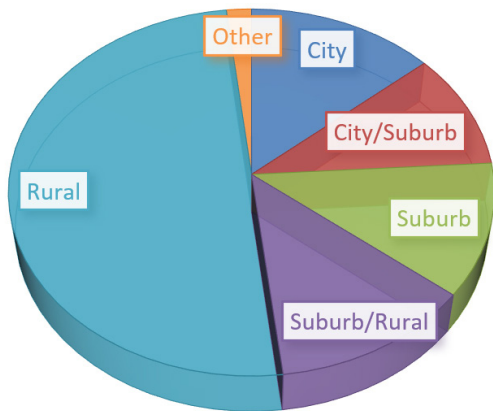


Figure 1. Library Community Type

What do you classify your community as?

Figure 1 shows that 60% of the surveyed libraries classified themselves as a rural or rural/suburb community. This distinction is encouraging since our mission is to impact underserved and under-represented communities such as rural.

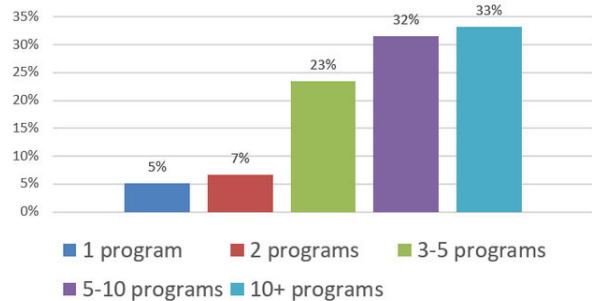


Figure 2. Number of Space Science Programs

How many space science programs did your library offer this summer?

One of the main goals for the *Summer of Space* campaign was to prepare library staff to conduct effective STEM programming. Nearly 33% said they offered ten or more programs, and another 32% offered 5-10 programs. (Figure 2)

How many people attended your program(s)?

Attendance at *Summer of Space* programs ranged from only 15 participants at one program to 8,400 attendees at a multiday program.

“We had 1,200 kids sign up for our Summer Reading Program. We hosted 50+ programs with over 3000 attendees. We used many of the ideas from the STAR Net / NASA@ My Library and Lunar and Planetary Institute to brainstorm for our program planning. Thank you!”
- Renee Cogan, Melrose Public Library, Massachusetts

Tell us about any organization with which you partnered.

Libraries listed 1,500 interactions across the country over the course of the summer, including organizations and individuals. This consisted of over 400 NASA specific interactions including the Night Sky Network, Solar System Ambassadors, or NASA Center employees. (Figure 3)

Respondents also had the opportunity to list specifically their program partners. Below is a sampling of their responses:

“University of Texas Marine Science Institute NASA engineer from Johnson Space Center and Jet Propulsion Lab engineer”

“The Rockford Discovery Center, Driftless Region of SW Wisconsin, Welty Environmental Center, Juda School District Rocket Presentation”

“Ute Indian Museum, Nature’s Educators, STEMpunkEd, Botanic Gardens, Canyon Country Discovery Center, Black Canyon Astronomical Society, STEM coordinators at schools, Science Matters, Cities of Montrose and Olathe”

“Andrew Shaner, Lunar and Planetary Institute, Universities Space Research Association”

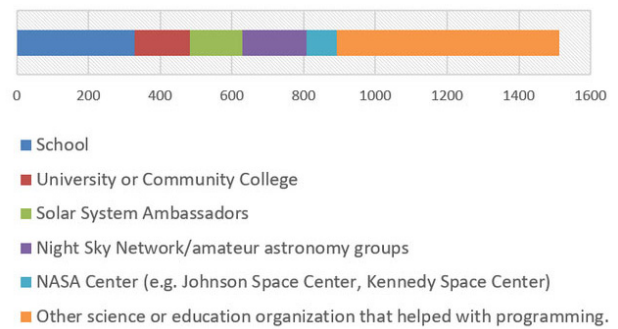


Figure 3. Partner Organizations

What Summer of Space Resources did your library use in their programming?

This question was important as a guide to understanding which resources were the most valuable by participating libraries. NASA materials distributed by *STAR Net* garnered the largest response at 68% closely followed by *STAR Net’s* STEM Activity Clearinghouse resources at 59%. 50% used the images and videos provided for educational/promotional resources. The details of specific responses are seen in Figure 4.

Resources Used	Responses
STEM Activity Clearinghouse items (Universe of Stories collection)	60% (585)
Summer Reading Champion videos (co-developed by CSLP)	16% (154)
STAR Net webinars	36% (354)
How-to videos	27% (266)
Press/media templates	17% (166)
Images and videos for promotional/educational purposes	50% (490)
NASA materials/resources distributed by STAR Net	68% (665)

Figure 4. Summer of Space Resources Used

Did your library participate in CSLP’s “A Universe of Stories” summer reading program?

Overwhelmingly, the libraries who were participants of *Summer of Space* also engaged with CSLP’s summer learning program (96% to 4%).

Which of the CSLP programs did your library use?

99.5% were Children focused, 77% were Teen and Early Literacy, and 55% were Adult.

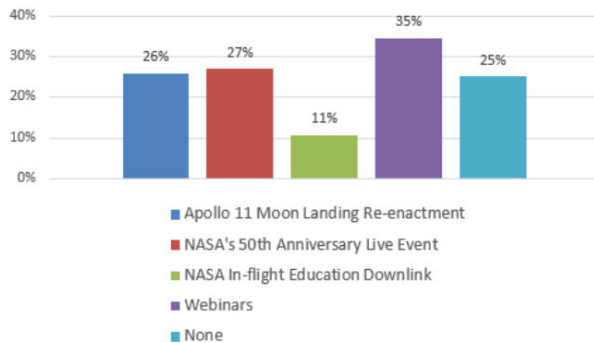


Figure 5. Summer of Space Key Events and Programs

What Summer of Space events did your library participate in?

Star Net webinars were important in preparing libraries for the Summer of Space campaign. Over 34% of libraries surveyed found them to be valuable. As described in Section 2, the NASA 50th Anniversary live event (July 19, 2019) was 27% followed by the Apollo 11 Moon Landing Re-enactment (July 15, 2019) at 25%. (Figure 5)

Finally, we asked respondents to share some memorable quotes from their patrons over the course of the summer. Here are some examples of their answers (more are listed in Appendix A):

“One of our little girls said, “When I grow up I want to be a NASA astronaut!”

“During one of our programs about the moon, one young participant shared, “I learned there is no sound on the moon and that you need to buckle up to sleep!”

“We broke all records this year for participation in a Summer Reading Program with this year’s, “Universe of Stories”. Our Space Camp and STEAM Summer Camps really helped share the excitement for the Summer of Space!”

By examining the large sample size of those who participated, we know the impact our event had in encouraging thousands of libraries across the country to expand their knowledge of STEM programming – specifically related to space science and exploration. From our survey results, we estimate that 2,400 registered libraries were rural. We also found that libraries conducted an average of 8 programs over the summer. This implies that the Summer of Space registered libraries conducted about 38,400 programs serving 960,000 patrons. We believe that the Summer of Space campaign had a significant impact on public libraries and their communities across the country.

7. Conclusion/Future Events

Building the capacity of public libraries and library staff to deliver engaging, inspirational, and educational STEM programs has the potential to transform the STEM education landscape across the country. What started in libraries some years ago as independent experiments in STEM programming has become a national STEM education movement. Libraries host exhibits, public science programs, book clubs, and story-time activities. They are also eager to participate in local and national STEM events, like *Summer of Space*.

Public libraries are particularly ideal for reaching populations underserved and underrepresented in

STEM-related fields. Public libraries serve people of all races, ages, and socio-economic backgrounds and are re-envisioning their mission and role in the community; they are “on-ramps” to STEM learning by creating environments that welcome newcomers to their community.

The STAR Library Network (*STAR Net*) will continue to work closely with the nation’s public libraries, and looks forward to future event opportunities.

The word cloud below was made from the most frequent words that appeared in quotes from patrons. Word size is related to frequency.



About the STAR Library Network

Libraries across the country have been reimagining their community role to strengthen community-based learning and foster critical thinking, problem solving, and engagement in science, technology, engineering, and math (STEM). *STAR Net* (www.star-netlibraries.org) focuses on helping library professionals build their STEM skills by providing “science-technology activities and resources” (STAR) and training to use those resources. It includes a STEM Activity Clearinghouse, blogs, a webinar series, workshops at conferences, and a monthly e-newsletter. Partners include the American Library Association, Association of Rural and Small Libraries, Collaborative Summer Library Program, Chief Officers of State Library Agencies, Afterschool Alliance, Lunar and Planetary Institute, and many others. The *NASA@ My Library* project leverages *STAR Net* and utilizes NASA-funded subject matter experts (SMEs), NASA Science Mission Directorate assets and data, and existing educational products and online portals to create compelling learning experiences for public library staff and patrons.

About the National Center for Interactive Learning (NCIL)

The National Center for Interactive Learning at the Space Science Institute is dedicated to expanding the understanding and participation of families, youth, teachers, and citizens in science and technology (<http://ncil.spacescience.org/>). We foster collaboration between STEM professionals and educators to bring the wonder of science and engineering directly to people. Our programs span a range of audience needs and delivery methods, including traveling museum and public library exhibitions; educational films, videos, and websites; hands-on resources and activities; and educator workshops. Our programs are designed to be accessible to all, and to inspire the next generation of STEM innovators. They have a positive impact on rural and urban communities nationwide and reach underserved audiences with inspirational, fun, and innovative STEM activities.

Appendix A: Quotations from Libraries



Credit: Deaf Smith County Library

"During one of our programs about the moon, one young participant shared, "I learned there is no sound on the moon and that you need to buckle up to sleep!"

- Jamie K. Faló, Greensburg Hempfield Area Library, Greensburg, PA

"The theme was excellent and highly adaptive to all ages. Our increased attendance was probably due to this year's theme."

- Tina Meiners, Montrose Regional Library, Montrose, CO

"I learned so much about space this summer, I had no idea I could learn so much from a fun craft activity!"

- NMB patron LeAnn Haste, North Miami Beach Public Library, Miami, FL

"As my 1st year as a Children's Librarian, I was so happy with the events and helping improve the space section of our library. Our patrons especially the children loved the activities and websites that helped them learn more about space and the universe."

- Ruth Bonzo, Nephi Public Library, Nephi, UT

“The biggest draw we had definitely was the US Space & Rocket Center’s Global Launch on July 16, 2019. We had 58 participants and launched 300 rockets. Each individual made their own rocket out of printer paper and we launched them using a compressed air launcher i made from PVC and a compressor. We had participants ranging from 2-74 years of age. We even had our Human Resources Director and County Sheriff attend along with most of our library staff and patrons form all cities within our county and neighboring counties. Everyone thoroughly enjoyed the process of building a rocket and the celebration of launching their rocket. Many said it was a great feeling to be part of something bigger than themselves, city, county and country; something that reached so far around our globe, past, present and future.

I am a new STEAM Coordinator for our library and have been having a hard time finding good lessons to teach the children of our county. If it were not for the NASA STEM Class I attended in Sparks NV, I would not have known about the Star-net clearinghouse and Global launch, which were all great resources for our library to share with the public.

Thank you, STAR Net and NASA, for providing me with great resources to expand the young and old minds of our rural county. “
- Ronnie Hawkins, San Andreas Public Library, San Andreas, CA

“Space should be the summer reading theme every year!”
- Kathy Gerber, Brooklyn Public Library, Brooklyn, NY

“One parent told me that her (elementary school age) son talked about Mars explorations for weeks after my presentation and the activities we completed. While this made me feel happy, that people felt like they had learned something they wanted to share with others, I know I was only successful because of the great resources I was able to locate on the NASA website like: SOI resources for educators. Thank you for your providing resources that helped me create exciting programs that inspired children to stay engaged!”
- Colleen Crowley, Foothills Branch Library, Glendale, AZ