

Eclipse 2017 in Libraries: The Impact of Providing 2.1 Million Eclipse Glasses and Support to 7,100 Libraries Nationwide

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Abstract. With support from the Moore Foundation, Google, NASA, and the Research Corporation, we were able to distribute **2.1 million eclipse glasses** (and an extensive booklet of eclipse information and outreach ideas) to approximately **7,100 public, school, tribal and military libraries** throughout the U.S. This project was the single largest program to provide glasses and eclipse information to the public in the country for the 2017 total eclipse. The project used (and significantly enhanced) the existing STAR Library Network, set up and maintained by the National Center for Interactive Learning at the Space Science Institute (with support primarily from NSF and NASA.) We were able to provide glasses and information to a diverse set of institutions, including urban, rural, tribal, small-town, and large-city libraries, and were thus able to reach audiences not usually served by science outreach programs. Participating libraries were required to conduct a minimum number of events (in addition to the eclipse day event) and many partners from other national outreach projects worked with local libraries to put on educational events before or on the day of the eclipse. Here we summarize the history of the project, the various components and how they worked together, and the results of a post-eclipse survey of the librarians, which provided numbers, photographs, and reflections from the libraries and their patrons.

1. History of Project

“We had one of the biggest events our Library has ever seen. So, in my language, we say Waewaenen (Thank You)!” -- Menomin Hawpetoss, Menominee County Library, Menemonee Nation, Michigan

This project was the brainchild of the first-named three authors, Fraknoi, Schatz, and Duncan, who brought it to the National Center for Interactive Learning (NCIL) at the Space Science Institute (SSI), led by Dusenbery, and to the foundation that provided the major support for it. SSI provided most of the staff and infrastructure for the ambitious project, made possible by SSI's ongoing program of working through its STAR Library Network.

One of the great challenges of a total eclipse experience (in any country) is how to distribute safe viewing glasses and non-technical information beyond the "usual suspects" (people whose social or educational background makes it easy for them to tune in to science news and obtain science-related resources.) For most of 2016, we had been brainstorming about how to reach a much broader segment of the American public for the August 2017 "all-American" eclipse, which was likely to receive unprecedented media coverage and thus public interest.

We knew that professional and amateur astronomers, science museum staff, park rangers and other nature interpreters, and science teachers, would be tuned into the coming of the eclipse long in advance. But how could we get glasses to people who would just be "waking up" to the coming of the eclipse a few weeks or even days before the event (when the regular news media really started to trumpet it?) We also knew (from discussions Duncan had with the two main U.S. manufacturers, American Paper Optics and Rainbow Symphony) that by that point, all the glasses from their factories would have been distributed to organizations, businesses, and people who ordered them early. Many science center stores and others specialized stores would likely be running out of their supply at just this time. What non-profit institution, we asked ourselves, could help us be ready, even at the last minute, to distribute glasses and viewing information to "the rest of the country?"

That's when we realized – there was an institution in every town in America already in the information distribution business: **the public library**. SSI already had an active and successful initiative in this arena -- their STAR Library Network (*STAR Net*) that was supported primarily by the National Science Foundation and NASA (<https://www.starnetlibraries.org/>). *STAR Net* is a hands-on learning network for libraries and their communities across the country. STAR Net focuses on helping library professionals build their STEM skills by providing "science-technology activities and resources" (STAR) and training to use those resources. There were already 1,500 members in 2016, and SSI and its library partners (e.g., American Library Association, Association of Rural and Small Libraries, Chief Officers of State Library Agencies, and Online Computer Library Center, Inc.'s Web-Junction) could inform the full range of public libraries in the nation about the new program we were planning.

The problem was that of funding. Library budgets are tight in most places and not geared to large public give-aways. Most libraries that serve the kinds of audiences we especially wanted to reach (inner cities, neglected rural areas, tribal reservations,

etc.) would not be able to pay for bulk orders of the glasses and the costs of mailing them. We needed one or more outside funders. Both Fraknoi and Duncan independently discussed the quandary with staff at the Gordon and Betty Moore Foundation, and found receptive ears among their science and education staff.

After the Moore Foundation entertained and then approved a formal proposal for distributing 1.2 million glasses (and for producing an information booklet specifically aimed at librarians who were not science experts), other support was easier to line up. Google came on board (as part of a larger MegaMovie outreach project they were participating in) with an additional 0.8 million glasses, and then several smaller-sized donations (from NASA and the Research Corporation) got us to 2.1 million glasses. Based on discussions and reviews of the many eclipse outreach projects within the American Astronomical Society 2017 Eclipse Task Force, it appears that ours was the largest single free distribution program of glasses and information booklets for this eclipse.

One important lesson that we share for future eclipses is the nature of the arrangement we had with the glasses' factories. Neither SSI nor any other involved institution was set up to mail out the individual packages of glasses, booklet, and other materials to thousands of libraries, plus deal with returns, lost or damaged packages, etc. However, both American Paper Products and Rainbow Symphony were in the business of doing these kinds of mailings. Letting them handle the logistical burden of mailing (for a very reasonable fee) was exactly the right choice. This left the project staff to do what it did best, which was producing the educational materials, training the librarians, organizing outreach partners on a national scale, and managing the website (Eclipse Resource Center) and social media needs.

2. Response from Libraries

"My deepest gratitude for all your help these last few month, guiding me through the process... We had a huge attendance and gave out all the glasses... We also did some target programs prior to the eclipse, visiting underserved children [and other outreach programs]... Your resources and support were of tremendous help to us in our endeavors." –Patrick Heath Public Library, Texas

Once information got to individual librarians, library staff began to apply to the program in ever-growing numbers. Between August 2016 and July 2017, the total numbers of libraries (including branches within systems) went from about fifteen hundred to over seven thousand.

In the first six months of 2017, several of us appeared in national and local media discussing the project. Information about it also became available on NASA's eclipse website (and many other web pages.) As a result, more and more people heard about the program and contacted their local library. Librarians who had missed the information about the project when it was first disseminated then quickly tried to apply. We were able to accommodate a good number of them.

By the summer, more than 4,000 library systems applied for glasses, representing more than 7,100 individual libraries. We quickly realized that the numbers were outgrowing our supply of glasses (and information booklets). We went back to the Moore Foundation and they were able to increase their support. As discussed above, we also were able to be included in a plan the Google Corporation developed to do eclipse outreach and to get additional glasses made and distributed through them. By the end, we surprised ourselves by distributing a total of 2.1 million glasses -- all in time for them to be mailed to participating libraries and distributed locally for the eclipse.

But still requests for glasses kept coming in. After the eclipse, SSI staff estimated how many glasses libraries requested beyond the supply we had available. That number turned out to be slightly more than 1 million! To help these libraries, we let them know that the project's free Eclipse Guide (Fraknoi and Schatz, 2017) was online and had a long section explaining safe viewing methods that could be used by people without special glasses.

The application process which libraries had to follow required them to specify the name and contact information of the librarian who would be in charge of the process, to explain their outreach plans before and at the time of the eclipse, and to help us understand what efforts they would be making to reach underserved populations. Although this meant that SSI staff had to examine each application to make sure the required information was supplied, this really cut down on involvement by libraries that just wanted glasses and were not serious about community outreach and service.

3. Eclipse Resources

"The 1000 pairs of glasses you sent were gone in 24 hours...As I was leaving work one day, I heard a [rural] family mention the eclipse...and that they were going to use sunglasses. I went back to the library and copied off ... the information safety handout... these are just the people you were targeting... they have no electricity or running water and live totally off the grid...Thanks for saving their eyes." – Salmon Public Library, Idaho



Fraknoi and Schatz jointly wrote the project's 24-page Eclipse Guide (which is still available on-line at: <http://www.starnetlibraries.org/EclipseGuide/>). The Guide was aimed at librarians without extensive background in science and was designed to make them sufficiently knowledgeable to lead local eclipse programs. Besides information about eclipses in general and details of the 2017 eclipse, it included clear, specific instructions on where in their communities they might find local "eclipse experts" (scientists, educators, amateur astronomers) to help with such programs. Guide development and printing were supported by the Moore Foundation.

An *Eclipse Education Kit* was mailed to 2,250 libraries selected through the application process. Each Kit included 200 or 1,000 solar viewing glasses, depending on the library's self-reported need. In addition, each Kit included the Eclipse Guide, the Astronomical Society of the Pacific's *Modeling Meaningful Eclipses* activity (<https://www.astrosociety.org/ASPYardstickEclipseInstructions.pdf>), and a folder packed with *STARNet* and NASA science materials. Once the available funding for printed copies of the Guide (and kits) was exhausted, librarians who then received only the glasses were referred to the Eclipse Resource Center webpage (<http://www.starnetlibraries.org/2017eclipse/eclipse-resource-center/>) where free master PDF files of the Guide were available for downloading and printing.

Furthermore, *STAR Net's* STEM Activity Clearinghouse served as the one-stop-shop for free eclipse activities appropriate for a library setting. Library staff and other eclipse program leaders could use the Clearinghouse's search tools to filter activities by content area, age group, time to complete activity, time needed to prep ac-

tivity, cost associated with activity materials, difficulty level (by content), or mess level. Or, they could view the entire collection of eclipse-related activities –and explore resources for ongoing STEM learning.

4. The Eclipse Map

“Here in Tumwater, Washington, there were more people who came than glasses to hand out...It didn’t matter at all; in fact it turned it into more of a community event...people talked with each other and shared glasses as well as the experience...we felt united as a community, all in awe of the skies.” – Washington State Library Outreach Librarian

One particularly useful feature of the project website at SSI was an interactive map of the US with the participating libraries shown (see the box at the end of this article.) As the map became increasingly populated with libraries, it showed NASA and the news media that the project truly was national (leading to more publicity.) It allowed members of the public to click on libraries in their local region for contact information, which let them determine where glasses were available, and, as it got closer to eclipse day, whether there were any glasses left at their local library.

There were several periods in July and August, especially after the project was on national news channels and after rumors spread that Amazon had been selling “defective glasses,” that SSI’s servers, on which the project map and website were kept, became overwhelmed. Also, librarians who no longer had glasses to distribute contacted the project in this period and begged for their contact information to be removed, because their staff was overwhelmed with fruitless public inquiries. SSI staff (to their credit) were able to bring servers back on line quickly, and satisfy most requests for removing library contact information. The lesson here was that including sufficient staff time in the grant proposals was very important. We are grateful for project funders understanding this need. Without significant staff involvement, this project would have been less effective, and possibly not able to deliver on the promised glasses and resources.

5. Eclipse Webinars for Library Staff

Knowing that many library staff members had little background in science and in eclipse observing, *STAR Net* offered professional development in the form of ten different free webinars. The aim was to help library staff develop strategies for safe, interactive eclipse programs and to highlight high-quality resources they could use. Webinars were open to library staff and their partners across the U.S. (not just those selected to receive Kits). These had a total attendance of over 1,000 librarians. At the close of each webinar, participants were directed to a brief survey. The webinars were recorded and made available free for librarians who were busy at the time of first presentation. The archived webinars were viewed an additional 1,800 times.

The webinars involved both eclipse information and training on how to do activities and viewing events. They were designed to serve libraries both in, and outside of, the path of totality since most library staff did not have the luxury of traveling to totality. Survey respondents valued the interactive nature of the webinars, especially the live demonstrations of activities and the opportunity to interact with other participants via chat. One respondent wrote: “I’ve been reading about [the eclipse,] but being told and shown visually was super helpful.” Another participant concluded, “I feel like I can do an [eclipse] program now.”

In planning for 2024, library staff requested more training on how to celebrate the eclipse in communities that are not in the path of totality. In addition, they told us that the eclipse attracted the attention of not just families, but many adults who were eager to learn more about this celestial event. More ideas for creating engaging programs for adults are needed.

6. Partners for Participating Libraries

“[I did] a training exercise with the librarians at the Manhattan Library in Kansas. I went over several ideas of how we can present to their public about the eclipse.... I gave them handouts and posters for their display...I brought many props [and activities] about moon phases, eclipses, the Sun, and [even] the Pocket Solar System activity...They loved everything I showed them... We even discussed extending our partnership for future outreach programs with their public.” – Amateur Astronomer (Member of one of the Night Sky Network Clubs)



Transylvania County Library, Brevard, North Carolina

We also made a strong effort to encourage scientists, educators, and amateurs to volunteer to help libraries before the day of the eclipse, as the eclipse experts would most likely travel to the path of totality, and not be available on the day of the eclipse. We enlisted the help of several astronomy outreach programs, including the Night Sky Network of amateur clubs (run by NASA/JPL and Astronomical Society of the Pacific), members of the American Astronomical Society with an interest in outreach (including their Ambassadors program of young astronomers), NASA/JPL's Solar System Ambassadors, science teachers affiliated with the National Science Teachers Association (where Schatz is on the Board), park rangers, and others. In good measure because of this support, registered libraries were able to conduct 35,000 eclipse based programs in their communities, reaching approximately 1,750,000 people!

While we only have partial statistics, we know many libraries took advantage of these connections to hold community information programs in advance of the eclipse. For example, the Night Sky Network and Solar System Ambassadors together logged 690 library events on their websites, and not all members logged their events. (Dusenbery et al., 2017)

7. Post-Eclipse Survey of Library Staff

“This was one of the best programs the Library has had. All of the people came together as one and just had a great time in the interest of science.” – Lebanon Public Library

A survey of Eclipse Kit recipients, performed using Survey Monkey, drew 1,193 responses, giving us statistically significant data. About 85% of the librarians indicated that they got all their eclipse glasses through our project. Others were able to get donations or internal funding to acquire an additional supply. More than 65% of the libraries indicated that they had made special efforts to get glasses and information to audiences normally underserved by and underrepresented in science.



Keene Memorial Library, Fremont, Nebraska

Extrapolating from the survey responses, the project staff estimated that the 7,100 participating libraries held some 35,000 eclipse-education events, and that these events reached about 1.75 million people in their home communities. With each pair of glasses being shared by families, groups, or at library locations, we estimate some 6 million people were able to observe the eclipse safely thanks to our efforts.

8. Lasting Consequences

“Our eclipse programming has connected us with community collaborators for future programming and has created excitement from our patrons about future STEM programming.” -- Fort Fairfield Public Library

While the post-eclipse surveys of the librarians showed much satisfaction in and gratitude for the project, what we were particularly gratified by was evidence that the project could have effects that last long beyond the Aug. 21st eclipse itself. The American Library Association told us that this was the largest project so far to organize libraries on a national scale for a science-based event and that its reach impressed everyone involved. Libraries reported increases in funding, new partnerships, surges in circulation, and new library card holders. One library even reported that they’re getting a new building as a result of their work with the eclipse!

Individual libraries also reported that the eclipse brought in new patrons, many of whom had not before appreciated how much modern public libraries do for their

communities these days. As a Michigan librarian reported, "...more importantly, [people] got library cards, they checked out books, and they came back. This [event] helped them see us for what we've become, not what we were like when they were children."

The much larger STAR Library Network that we created through the eclipse is now continuing with the program it originally set out to do – to provide information, activities, and events related to space science to interested libraries. Over 8,000 library and STEM professionals have now joined STAR Net to access webinar trainings, monthly newsletters, professional blogs, partnership opportunities, facilitation guides, book recommendations, and much more, including *STAR Net's STEM Activity Clearinghouse*.

The *STAR Net* website, *STEM Activity Clearinghouse*, the newsletter, blogs, and the offerings of downloads of free materials are now available to and being used by many more libraries than before the eclipse. Already, additional campaigns have been carried out using libraries to disseminate information about the Parker Solar Probe, the Insight Mars Mission, exoplanets and other space science topics.

The full report about this project can be found on the Web at: <http://www.starnetlibraries.org/wp-content/uploads/2017/12/Moore-Final-Report.pdf>

Acknowledgements

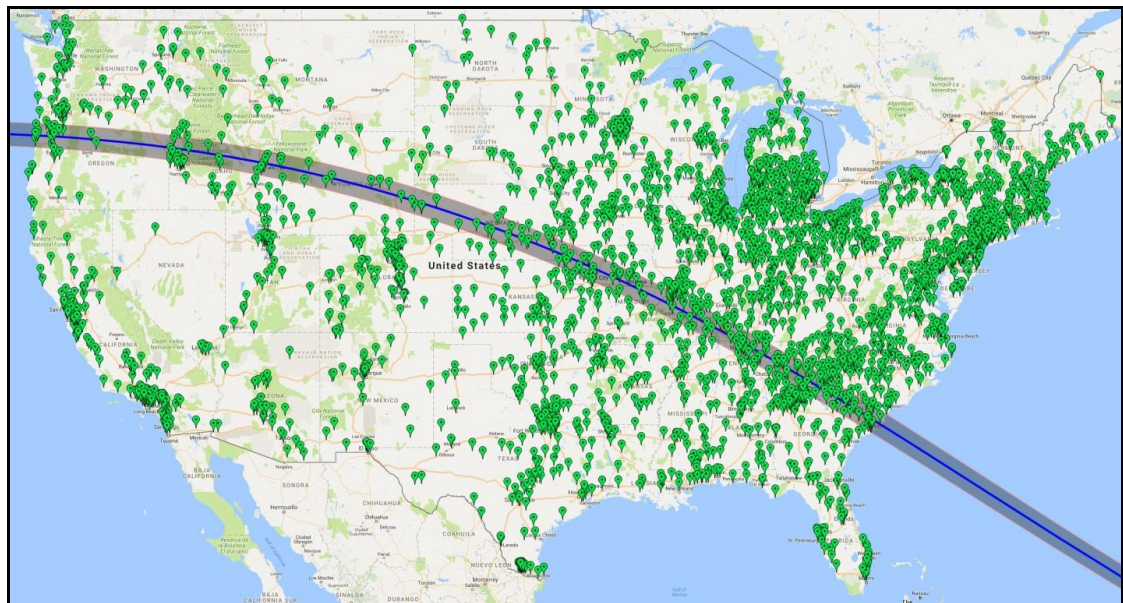
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The Eclipse Libraries Project: Numbers Summary

- * **Number of glasses distributed: 2.1 million**
- * **Estimate of number of people seeing the eclipse safely with those glasses: 6 million**
- * **Number of glasses requested (after supply ran out): over 1 million**
- * **Number of library systems involved: 4,000+**
- * **Number of individual library branches participating: 7,100**
- * **Number of librarians taking an eclipse webinar: 2,100+**
- * **Number of eclipse science programs in those libraries: 35,000**



Map showing the participating library systems in the U.S. together with the total eclipse track. You can see that the libraries involved were much more geographically distributed than the eclipse itself.