Inspire! Grants for Small Museums

Sample Application IGSM-251427-OMS-22
Project Category: Lifelong Learning

Ball State University (Charles W. Brown Planetarium)

Amount awarded by IMLS:	$49,146
Amount of cost share:	$0

The Charles W. Brown Planetarium will expand the number of engagement opportunities it offers to school groups and the public, with a focus on exploring the scale of both space and time in the universe. Project activities will include expanding the number of pre-recorded planetarium shows offered, adding orientation exhibits to the planetarium lobby, and introducing daytime telescope viewing opportunities. Both professional and student staff members will participate in conferences and training activities intended to support their active facilitation skills. The project will expand the length of time visitors spend in the planetarium, deepen the questions and conversations that occur at events, and help with engagement and content retention.

Attached are the following components excerpted from the original application.

- Narrative
- Schedule of Completion

When preparing an application for the next deadline, be sure to follow the instructions in the most recent Notice of Funding Opportunity for the grant program to which you are applying.

Ball State University, Charles W. Brown Planetarium, IMLS Inspire! FY22: Narrative

Project Justification

"The Charles W. Brown Planetarium: Expanding Engagement Opportunities Through Space and Time" project will expand the number of engagement opportunities offered during public events by adding exhibits, daytime telescope viewing options, and new accompanying programming. Planning and implementation will focus on incorporating a variety of learning options that explore the scale of both space and time in our universe. Increasing the ways in which visitors can engage with science will promote an active exploration of their place in the cosmos, leading to content retention and lasting interest.

The goals of Ball State University, the Brown Planetarium, and this project align with the objectives of program goal 1 on lifelong learning as it supports public family programs, exhibitions, and in-school and out-of-school programs. The project also aligns with program goal 2 on institutional capacity. Specifically, objectives 2.2 and 2.3 will be met as our project supports the recruitment, training, and development of staff as well as technology enhancements. To fulfill Ball State's goals for community engagement and inclusive excellence, we design events so they are welcoming and accessible to a diverse population, eliminating financial and physical barriers where possible. External funding from grants allows us the opportunity to continue to offer exclusively free planetarium programing, something we have done at Ball State since the 1960s. It is in this way that we can reach underrepresented and underserved students, educators, and community members, broadening participation in STEM engagement opportunities – making lifelong learning a passion for all. To help continue our work, we propose this project as a means to grasp the attention of our community by tackling the question "what is our place in the universe?"

To explain our place in space to our community and invite them to join in on a conversation about it, we turn to the power of the immersive planetarium. Planetariums are a unique medium for innovation and discovery, making them engaging facilities where learning happens. During planetarium events, we are helping to build an inquiring and engaged community of individuals who are empowered to bring their own strengths and skills to any table they wish to join. The large dome provides learners with a complete field of view and the digital fulldome visuals offers a virtual environment experience. Traditionally, concepts in astronomy are difficult for learners to comprehend primarily because they involve the use of geometries and 3D orientations of celestial bodies. The expectation is for learners to visualize and conceptualize objects and their relationship in a 3D physical space while being taught by a 2D textbook. By bringing learners into a 3D environment, they can easily navigate through the content and have direct experiences with physical space and phenomenon. This makes the planetarium a prime location to explore the scale of space and time.

Our planetarium events typically include a live sky presentation from a trained facilitator, a pre-recorded planetarium show, and plenty of time for questions and requests. To keep our programs relevant and up to date, we need to offer a lineup of new and exciting planetarium show options. In 2020, we had a healthy show library of 17 full-length shows that were either purchased or created in-house. However, many of these programs have either become dated or the license period has ended. As a result, our show library will take a cut in early 2022 with only 9 of the 17 shows remaining to show to the public. To properly welcome guests of all ages, and encourage return visits, new show options are needed. Furthermore, while we have programming that looks at discrete astronomical objects such as individual planets, stars, and galaxies, only one program in our show library explores the vastness of our universe in both space and time. Expanding our programming to cover these concepts will help us better explore our universe from a holistic perspective. To do this, we will purchase two new show titles for our show library: "The Birth of Planet Earth" and "Living Worlds." By exploring the formation of our Solar System in the first program, visitors will be able to see how long timescales affect our universe and the life inside it. "Living Worlds" then takes a look beyond our Solar System to understand what life may look like many light years away and how we can detect it using today's technologies.

Prior to attending the main planetarium event in the dome, visitors congregate in the small planetarium lobby. While we currently offer hands-on, minds-on, and hearts-on portable activity stations before public events, our lobby space does not offer much in terms of exhibits. We need a lobby space that reflects the high-end technology and programming offered in the dome. This project will help fill in the empty space in the lobby, adding engaging visuals and information on various astronomy topics to complement new programming. For example, a 53' 5" long curved wall in the planetarium lobby is currently bare. This is a prime location for a long graphic exploring the timeline of the universe, which can be supplemented with floor banners that describe specific phenomena and events such as the formation of the first elements and then the first stars in the universe. The floor banners provide a manageable way to keep the space fresh as they can be easily updated and changed. Additional bare walls and windows in the lobby are prime locations for learning moments if covered in engaging material. These additional learning opportunities will attract many, especially those who may want to explore on their own and not engage directly with a facilitator at the activity station. This added experience will afford learners a better understanding of the universe prior to viewing a planetarium show, giving them multiple ways to engage with the material and concepts, promoting retention. This also means they will be better equipped to ask questions or propose ideas during the live and interactive portions of the event. By better promoting discussion and social interaction, guests may find the visit more enjoyable and memorable.

When exploring the scale and timeline of our universe, the Sun is a major discussion point. To complete a person's visit to the planetarium, we will offer daytime telescope viewing opportunities with a new portable solar telescope. Considering twilight does not end until roughly 10pm ET in the summer months at our location, evening telescope viewings for young learners is essentially impossible. Since many of our planetarium events and experiences are available only during the daytime, a solar telescope will offer an in-person telescope experience that our guests keep requesting, immersing participants in observational astronomy. The project would extend the current capability of viewing the Sun beyond white light to a very specific color of red light known as Hydrogen alpha. In Hydrogen alpha light one can see the atmospheric region of the Sun known as the chromosphere. By probing the chromosphere, our visitors can see dramatic features like solar prominences, filaments, and flares. Accompanying the white light view of the Sun, which shows where the visible light and energy that heats the Earth are produced, this gives a thorough view into how the Sun impacts our lives on Earth. Additionally, a high-end solar telescope provides the tuning range and accuracy needed for high contrast and high-resolution views of the Sun for both in-person and streaming events. These experiences will provide our visitors the best opportunity for a unique and memorable learning experience.

We know from experience that telescope viewing, exhibit spaces, and new show options do not by themselves guarantee a quality educational experience. In fact, a vital component for all of our planetarium programs is the live and interactive portion. Therefore, our planetarium staff have always provided personal interaction with our visitors. There is a friendly human face that interacts with guests, answers their questions, has conversations with them about astronomy, and more. This interaction with trained facilitators is vital and will always be part of a Brown Planetarium visit. That is why our staff will attend professional development opportunities where they will be rejuvenated through workshops and talks on how to best engage with the public, all while sharing their own tips and tricks within the professional community. These experiences will help keep the personal touch of our programming going strong.

While we will use formal surveys to gather feedback through this project, it is mainly through informal conversations and observations that we know guests are currently interested in our current lobby exhibits and show options and they would like to see more. Furthermore, group request forms ask for goals and objectives group leaders would like to have addressed during their school or group visit. Roughly a quarter of the requestors ask for a Solar System component, which makes the planetarium show, "The Birth of Planet Earth," a great fit for this project as it analyzes the scale of our Solar System and its components (a 5th grade science standard), as well as other science standards. Additionally, many people have asked about in-person telescope viewing opportunities, which resulted in the addition of the solar

telescope to this project. In fact, our recent live telescopic view of the Moon from the Ball State Observatory was the fourth highest post on our planetarium's Facebook page in terms of engagement (number of reactions, comments, shares, views, and clicks). All input and requests from visitors are taken seriously, and we will continue to gather and act upon feedback from guests and staff as we make future updates.

In addition to roughly 11,000 community guests that attend planetarium events, this project will also impact the over 9,000 school kids that visit each year on field trips. By incorporating various Indiana Academic Science Standards into the exhibit and show content, a planetarium visit will be more significant to schoolteachers. Their students will be able to experience the concepts they learned inside a classroom in a new, engaging environment. Aligning content to a school's curriculum makes the experience worthwhile to school trip facilitators and helps to ensure the educational content creates knowledgeable citizens and fosters workforce development. The educational content created or obtained through this project will be geared towards learners in grade 4 up to adults; however, we will invite people of all ages to enjoy the updated programming and spaces. Finally, the project will introduce new topics and equipment to personnel, offering additional training and professional development opportunities for student workers and professional staff.

Project Work Plan

Clear communication and organization are key to tracking the progress of this grant. Detailed planning meetings started with the ideation and design of the project and will continue until a final report and accompanying documents are submitted. Monthly leadership meetings will help guide us along our timeline and our schedule of completion will hold us responsible for reaching important milestones and deadlines (outlined in the table below).

Date	Activity/Milestone	Potential Risks & Mitigations
Sept. 1, 2022	Grant period begins. Exhibit design and planning starts. Meetings with university Printing Services and Marketing and Communications are scheduled as needed.	In the rare case that Printing Services lacks either the equipment to produce the work or the ability to meet our deadlines, university Purchasing Services will help ensure the job will be completed by an outside commercial printer.
mid-Sept.	Final review and purchase of solar telescope.	In the case that the proposed telescope is no longer available, a comparable telescope in price and design will be purchased.
Oct. (on arrival of solar telescope)	Solar telescope setup and testing. Training materials are developed for student workers and professional staff with an added focus on safety.	In the case that equipment is missing or damaged upon delivery, the vendor will be contacted immediately.
mid. to late Oct.	Attend and present at the 2022 Great Lakes Planetarium Association Conference.	In the case that in-person conferences are cancelled, staff will attend virtually.
Nov. 1	Finalize license agreements and purchase 2 fulldome planetarium shows.	As our knowledge of astronomy and science increases every day, there is always a chance that the programs suggested in this proposal will have become dated. In that case, with approval from IMLS, we will look for newly released programming that is comparable to the programming proposed here.
mid-Nov.	Conduct solar telescope training sessions for planetarium staff.	Additional training sessions will be scheduled as needed, especially in the case of poor weather.

Dec. 1, 2022	Produce brochures and advertisements for Spring 2023 semester programming, targeting community members and local schoolteachers and educators. Proper credit will be given to IMLS in all advertisements.	No potential risks are anticipated based on previous experience.
Jan. 9, 2023	Deadline for installation of fulldome shows on system.	Any playback issues will be corrected before they premiere in March.
Feb. 1	Send digital exhibit content to university Printing Services, await final proofs.	Edits and changes will be made as necessary to ensure quality printing and installation.
Feb. - March	Train planetarium staff on how to present fulldome shows in an engaging way that builds off the knowledge attained from exploring lobby exhibits.	Digital representations of exhibit materials will be used during training in the case that the exhibits are not yet installed. Additional training sessions will be scheduled as needed.
Mar. 12 (end of university Spring break)	Deadline for installation of exhibits.	In the case that the project is delayed, the lobby will still be functional.
mid-March – Aug.	Add fulldome shows #1 and #2 to show library. Present fulldome show #1 or #2 to est. 7,000 visiting school group guests (approx. 140 visits).	We will offer additional opportunities for students to visit during the 5-year show lease in case groups are not able to visit during this timeframe.
Mar. 17 – Apr. 1	Present fulldome show #1 over 3 weekends (minimum of 9 times) to the public with solar observing after select programs.	Poor weather plan: A near-real-time view of the Sun via the Solar Dynamics Observatory will be displayed on the existing planetarium lobby monitors in lieu of observing with the solar telescope.
Apr. 7 - 29	Present fulldome show #2 over 3 weekends (minimum of 9 times) to the public with solar observing after select programs.	See poor weather plan above.
June	Attend and present at the 20203 Live, Interactive Planetarium Symposium.	In the case that the in-person conference is cancelled, staff will attend virtually.
June – Aug.	Present fulldome shows #1 and #2 during summer public events (minimum of 8 times each) with solar observing after select programs.	See poor weather plan above.
Aug. 31, 2023	Project period ends. Reporting is finalized.	No potential risks are anticipated.

**In addition to the activities above, monthly leadership meetings will be held with a readout of the progress of each aspect of the project. Evaluation will be ongoing, with careful assessment and considerations made quarterly through focus groups and surveys. Logs, notes, and materials will be kept current throughout project to assist with reporting.*

The project will be managed, planned, and implemented by Planetarium Director, Dayna Thompson. With an M.S. in Physics and over 10 years' experience in the planetarium field, Ms. Thompson is well suited to lead the project. Acting Executive Planetarium Director, Dr. Robert Berrington, will provide expert guidance on the solar telescope and a Ph.D. astronomer perspective and review of the exhibition content. Planetarium Show Specialist, Ms. Melanie Isenbarger (B.S. in Astronomy), will provide input and guidance during project planning and will play a key role in the facilitation of the project, working as show presenter and manager of events. Additionally, student staff will help to facilitate and promote all aspects of the project, in addition to providing feedback. All work will be completed as a part of staff duties and will

not divert or distract from additional operations supported by the university. All resources necessary for the project are available on-site at Ball State (such as multimedia design teams and printing services) or will be purchased through grant funding. As such, university Marketing and Communications and Printing Services staff will be involved in exhibition design and completion.

To facilitate progress on the project, the Planetarium Director and the Planetarium Show Specialist currently work out of the same office space and communication flows freely, ensuring work is moving forward. A detailed log including group information (school name, grade level, etc.) and attendance counts will be kept for project assessment and reporting. Additionally, continuous contact with a designated grant manager and the department's administrative coordinator will help manage purchases and other aspects of the grant.

Project Results

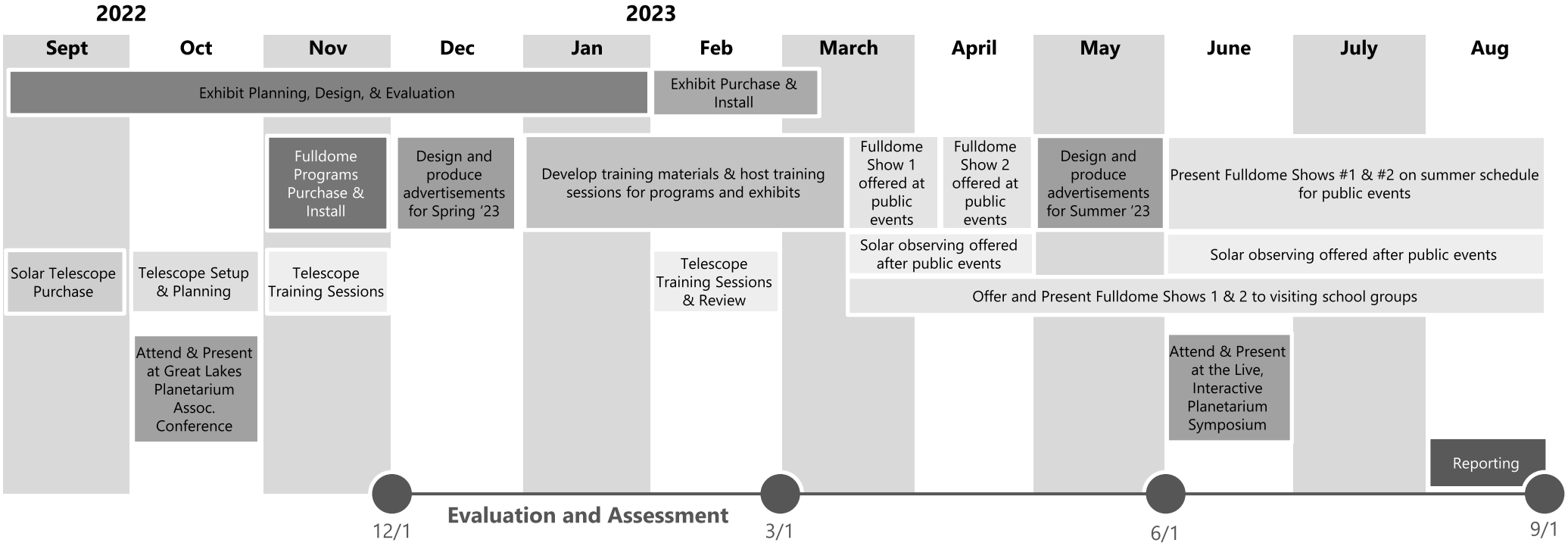
The Brown Planetarium will continue to attract over 20,000 guests annually with the help of opportunities supported through this project, which include: 2 full-length, fulldome planetarium shows; an array of floor banners and wall exhibits; 1 Hydrogen alpha portable solar telescope; and travel to professional development opportunities for Ball State students and professional staff. These new opportunities will expand the length of a person's visit to the planetarium, deepen the questions and conversations that occur at events, and help with engagement and content retention.

By offering a variety of learning options, we will be able to better reach all learners in more engaging and personalized ways. Visitors will discover how they fit into the universe in both space and time by exploring how vast the universe is in size and on how much time has passed since its formation through visuals, discussions, and activities. The variety of learning opportunities will better facilitate engagement in these topics and will help the learning gain a greater appreciation for the scale of the universe. Guests will enjoy newly designed facilities and experiences that match the state-of-the-art experience inside the planetarium, lifting the overall appeal of a planetarium visits. In-person, real-time views of the Sun will provide an extra chance to feel awe outside of the planetarium experience. Furthermore, student and professional staff will be afforded professional development opportunities through training sessions and professional conferences. Also, through meaningful and memorable interactions with the public, staff will gain experience working with new subject material and equipment, encouraging them along their career paths.

Approximately 10 planetarium staff members will benefit from the work and training experiences needed to carry out the project. The 2 new show titles will be shown to roughly 4,000 visitors and new exhibits will impact roughly 10,000 visitors during the grant period (based on 2018-19 attendance numbers). In addition to maintaining our average annual attendance, we aim to expand the number of planetarium visitors each year while encouraging return visits through this project. For instance, when bringing young children to our family-oriented programs, parents will be able to enjoy the more conceptually challenging lobby exhibits – capturing their attention and encouraging return visits for years to come.

Beyond the term of this grant, "The Birth of Planet Earth" and "Living Worlds" planetarium shows will be presented to the public and included in our show library for a 5-year license period. The lobby exhibits will also be used for many years to come, with minor updates to the wall designs and floor banners being made as needed with internal funding to keep the exhibit current with new scientific discoveries and advancements. Additionally, the portable solar telescope will be ours to use for many years for community engagement, as well as for the training of student workers and professional staff. The solar telescope will truly benefit the community in the years after the grant period as the university is in the path of totality of the 2024 total solar eclipse. Education on the Sun and safe viewing practices will be key to having the community experience the spectacular celestial event.

Ball State University, Charles W. Brown Planetarium, IMLS Inspire! FY22: Schedule of Completion



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