SHARING PLANETARY SCIENCE IN A PLANETARIUM. A. Shaner[1], C. Shupla[1], A. Hackler[1], M. E. Evans[2], J. Filiberto[1], B. A. Hernandez[1], J. Kay[1], M. J. Matney[2], E. G. Rivera-Valentín[1], P. M. Schenk[1], S. Siran[1], [1]USRA-Lunar and Planetary Institute; shaner@lpi.usra.edu, [2]NASA Johnson Space Center.

Introduction: A portable planetarium is an ideal environment for engaging the public in NASA planetary science and exploration as it provides a unique, intimate setting in which to discuss and share current science and exploration topics at various community organizations such as libraries, camps and schools.

Over a decade ago, the Lunar and Planetary Institute (LPI) initiated a program to share the night sky through the use of a portable planetarium (StarLab). This system utilizes a light bulb and plastic cylinders to project a star field or constellation map onto the interior of the dome. In 2007, LPI began freely training and loaning the StarLab to local teachers and public librarians (Figure 1). By loaning out the StarLab, an estimated 25,000 people across central and southeast Texas have experienced the StarLab in the past six years, excluding attendance at events held at LPI.

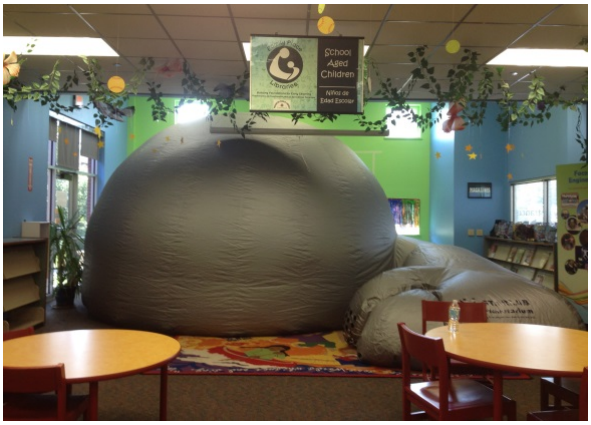

Figure 1. The Pasadena (TX) public library is one local institution trained to use LPI's StarLab.

The education and public engagement (E/PE) department at the LPI has a long history of providing successful public programming both within the Houston community, and nationally (Figure 2). One reason for the Team's success is its unique access to LPI and NASA Johnson Space Center (JSC) scientists, and their inclusion in this programming. The StarLab system is a wonderful tool for sharing the night sky (stars and constellations); however, without the ability to display planetary imagery, it does not allow the LPI to fully engage the public in NASA's planetary science and exploration. Despite this limitation, and the aging of the dome and cylinders, the StarLab has been a valuable asset in the LPI E/PE program's portfolio.

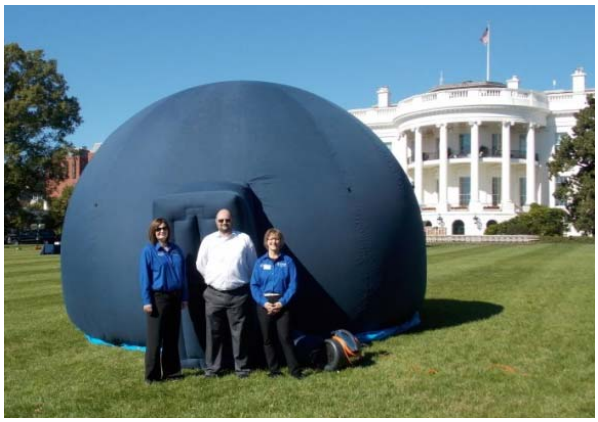

Figure 2. LPI E/PE staff borrowed a portable, digital planetarium to share NASA planetary science and exploration at the 2015 White House Astronomy Night.

New Planetarium, New Program: With funds provided by Universities Space Research Association (USRA), LPI purchased a new digital, portable planetarium system in late 2017. This new system opens the solar system to audiences. In addition to viewing the night sky from any location on the surface of the Earth (Figure 3), this system gives presenters the power to fly audiences to, and around, the Moon, Mars, Europa, Saturn and many other solar system targets. Also, 360° panoramas from the surface of a moon or planet may be created and displayed to provide audiences a sense of "being there." As NASA prepares to send crews back to the lunar surface, the ability to fly to and around the Moon to view both Apollo sites and potential future landing sites is invaluable for communicating these efforts to the public.

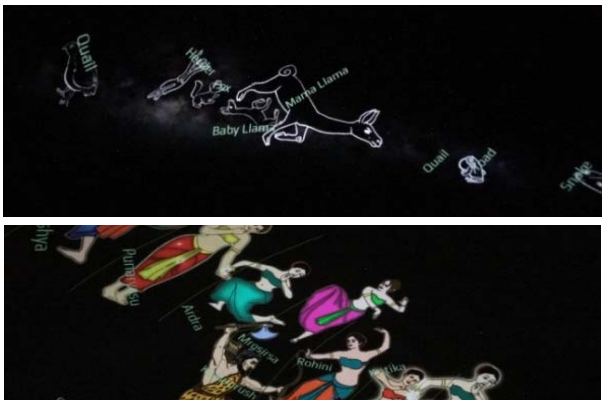

Figure 3. LPI's new digital planetarium system includes graphics illustrating constellations from cultures around the world (top, Incan; bottom, Hindi).

Scientist Engagement. In addition to LPI E/PE staff presenting planetarium shows, LPI and JSC scientists have been actively involved in use of the new digital planetarium in significant ways with a variety of audiences and ages. These Subject Matter Experts (SMEs) have helped facilitate shows and even created and led their own shows. Because of the wide range of possible topics that can be discussed, scientists (and engineers) from many different disciplines can use the digital planetarium to share their work.

The portable planetarium does have some limitations compared to larger, permanent planetariums, which may seat as many as a few hundred people. Portable planetariums can accommodate about 50 children, fewer people overall if adults are also in the audience. If the planetarium is set up at a large event, smaller audiences per show means more shows have to be presented. Given that events have time constraints, this translates to shorter planetarium shows in order to accommodate as many people as possible.

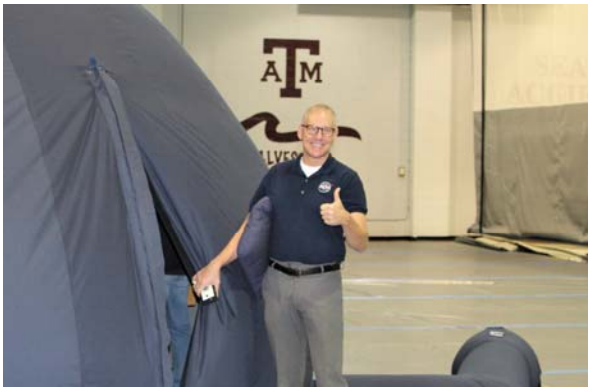

Figure 4. JSC scientist Dr. Mark Evans used LPI's digital planetarium to introduce planetary geology to maritime studies students at the Texas A&M-Galveston campus.

Despite these limitations, a more intimate setting allows a presenter to customize any given show to the interests of its particular audience and allow for more personal interactions. Instead of a pre-planned show, for example, audience members can "drive the show." Presenters ask which solar system object they would like to visit then "fly" to that object and discuss some science and exploration of that object while answering questions from the audience.

Portable planetariums also provide a mechanism for bringing the planetarium experience to underserved/underrepresented audiences that may not otherwise have the opportunity. A great way to engage these audiences in the planetarium is to present shows tailored to a community's culture. For example, LPI held a bilingual public event during the 2018 Hispanic Heritage month featuring planetarium shows showcasing telescopes of Latin America and constellations from South American indigenous cultures.

Impact to Date. In its first year of use, ~3,500 people viewed shows in LPI's digital planetarium. Locations where the planetarium was set-up include schools, public libraries, universities (Figure 4), camps (Figure 5), public events at convention centers, and the 2018 JSC Open House, as well as LPI events including LPSC 2018. In addition to LPI E/PE staff, eight scientists have presented in the digital planetarium; several have been trained to set-up and take-down the system. In 2019, LPI E/PE staff is training more scientists to use, and engage audiences with, the digital planetarium.

Additional Information: If you have any questions or would like additional information, please contact Andy Shaner at 281-486-2163 or send an e-mail to shaner@lpi.usra.edu.

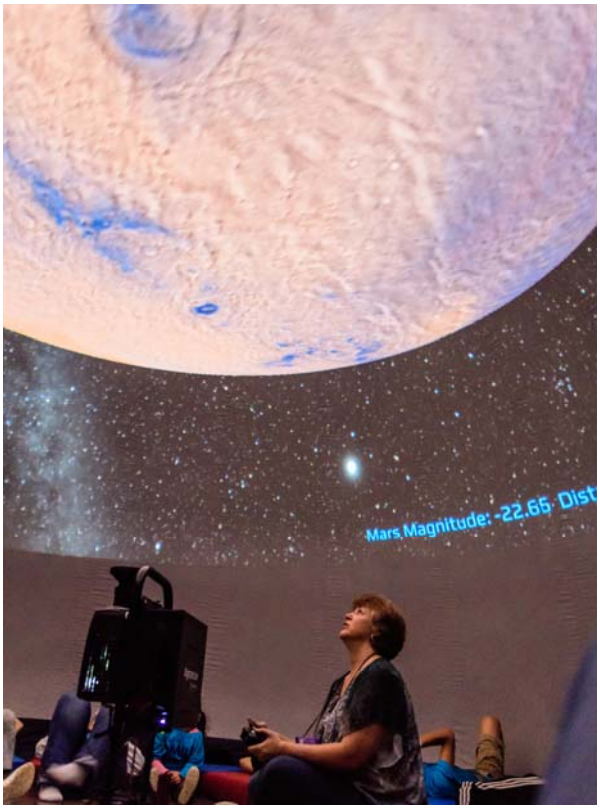

Figure 5. LPI education lead Christine Shupla raps Mars science and exploration at a camp for children with cancer and their families.