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210°

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of Natural History

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A Sky-Skan install at Lowell Observatory.

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We love to showcase the work that our fellow planetarians are doing!

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IPS President Dave Weinrich
Welcome to the 2012
IPS Conference
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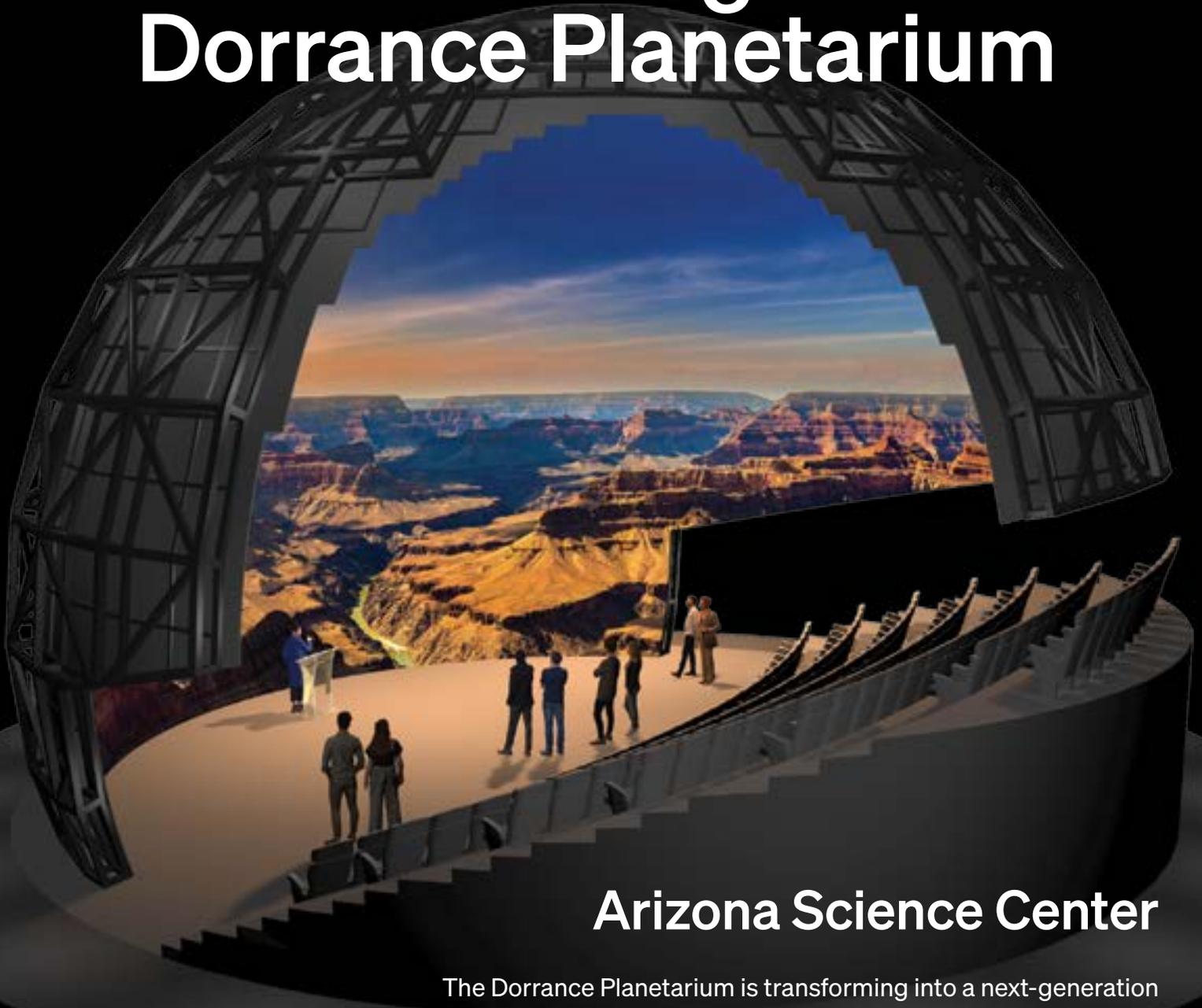
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HELLO FELLOW PLANETARIANS! A MESSAGE FROM THE PRESIDENT



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Our official centennial celebrations have come to a close with the worldwide virtual Closing Ceremony on May 7th. I would like to congratulate the Centennial committee, Björn Voss, Guilherme Marranghello, and Marco Avalos for organizing such a wonderful celebration of planetariums. The online celebration is still available to watch on the IPS YouTube channel. Fellow planetariums from 27 countries provided recorded greetings and there were live presentations from 8 domes representing each of our IPS regions. In addition, colleagues from adjacent organizations sent congratulatory videos including Nobel Laureates, astronauts, and even a rock star! The Space Telescope Science Institute released new JWST images to coincide with our anniversary. The president of the International Astronomical Union, Willy Benz, also wrote a letter that can be read on the IPS website. A theme was clear through the greetings. Planetariums have endured for 100 years because of the passion and innovation of planetariums and they inspire the next generation of scientists, engineers, artists, educators, and explorers.

Now looking forward, what better way to kick off our next 100 years than with 100 hours of astronomy? IPS and the International Astronomical Union Office of Astronomy Outreach are collaborating on this event themed around planetariums. 100 hours of Astronomy will bring people together all over the world for astronomy events and programs from October 2 - 4. We will have virtual planetarium shows and a talk about the Vera Rubin Observatory that you can share with your audiences. We will also have a 24 hour continuous live stream from planetariums all over the world. You can sign up for a slot to show off your dome! Be on the lookout from both IPS and the IAU about how you can sign up and participate.

On a more administrative side, we also want to make sure we keep IPS healthy. Running the organization does take funds. The last time we raised the dues for individual members was in 2008. For context that was the year *Iron Man* was released starting the Marvel Cinematic Universe, Barack Obama was elected president of the United States, Messenger did a flyby of Mercury, the Large Hadron Collider was dedicated and it was still 4 years until the Higgs Boson was discovered. I was just starting grad school and didn't know I had even contracted the planetarium bug. With costs rising, it is a necessary move to maintain the health of IPS.

Finally, since IPS is registered as a non-profit in the United States, I would like to acknowledge what has been happening with the federal government there. Federal funding for science, cultural institutions, universities, and various organizations including non-profits has been slashed. The US government has also started trade disputes which will greatly impact the cost of many goods, including those used in our field. Harmful actions like this toward science and cultural institutions is not new. Many IPS members around the world have dealt with and endured similar events over the years. No actions have directly impacted IPS so far and we remain stable. However, the officers are keeping a close eye on announcements and will act swiftly with the board to protect the integrity of IPS if anything were to arise.

Remember to take care of yourself and your fellow planetariums. It is our communities that help keep us going. Our community with each other as fellow planetariums and the communities we call home and serve. Hold onto that community. Remember that the work you all do is important and impactful to all your communities. Our centennial event proved that.



Shannon



P.S. UNSOLICITED BIRD FACT:

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Seeing beyond

ANOTHER YEAR, ANOTHER ROUND OF GOODBYES IN FRONT OF THE CONSOLE



Shiloe Fontes

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Here at Flandrau, we hire and train undergraduates for a variety of positions. This includes being a “Console Captain”, or a planetarium operator. We get freshmen and sophomores from a wide gamut of majors and backgrounds – some knew they loved the sky from day one, some have a passion for outreach, and some are just learning what it is they want to be doing here in college. Some are artists who have fantastic stage presence and are learning how to talk about the stars, planets, galaxies, and what happens when you fall into a black hole; others are young astronomers who know all about the physics of the aforementioned black hole but don’t know how to explain it all to a 4th grader. It is such a wonderful thing, watching all these students learn new skills and share their passions with our visitors. I get to watch them become more comfortable in their role and become a core part of our team.

And then they graduate.

Honestly, I think it is the worst part of my job.

Every semester, I carve out time to see each students’ last star shows; I was there for their first, and if I can, I will be there for their last. I often get to meet their families, friends, significant others. I will embarrass them by telling a little story about their first show, brag about how much they have grown, gush about how much I have learned from them.

Then, they leave. They don their cap and gown and they are onto the next thing. I feel so proud, so honored to have been part of their story. Their chapter here ends, and begins somewhere new. (Unless I can convince them to attend graduate school here...)

Contrary to popular belief, industry is not purely about astronomy. We are educators, storytellers, inspirers, and more. Our staff learn skills beyond those that are not based in numbers, letters, and symbols that – let’s be honest – some are just weird. They learn how to communicate science to people from all walks of life who may never have seen themselves in science, or thought themselves able to be part of science’s story. It is a really great place to be.

I have a new batch of undergraduates who are learning at the console as we head into summer. Some are students who have worked with us for a year now and something clicked – the dome called to them (and for once, it wasn’t our resident ghost!). Whether it is a fun show like *We are Stars*, our live star talk *Tucson Sky & Beyond*, or shows that have absolutely nothing to do with space, like *Expedition Reef*, the dome has something for everyone.



Luna often accompanies me into the dome. She even will take a seat, should she feel up to it. During one of our student’s last shows she opted to relax and watch the sky.

In that vein, I’m getting to collaborate with one of our University’s well know astronomers to create a live presentation that is part science, part live music, but all about the part that we play in the universe. It is fun to see how we can push the boundaries of what the dome can do and how we can invite more people in. It is meant to be a unique performance – if it happens again, it won’t be the same again, intentionally.

Unintentionally, however, we already know that no two shows are identical. Each operator brings their own personalities, backgrounds, dad jokes, and more to each show. Some are soft-spoken yet engaging, some are like talking to a young version of Bill Nye - but they all have that one thing, that little spark that got them interested in this role that they want to share.

And I think that is just wonderful.

As we head towards our 50th anniversary, I think about all the operators who have come before me, the dome directors that came before me, and those who helped point me into the direction I needed to go to be in this position. We are inherently like chain reactions of molecules, where one bumps another and starts something that is hopefully great, that grows until, like a star fusing iron and exploding, we kick off similar reactions into the next generation.

May we continue to tell those stories. May we inspire future scientists and future planetarians.

KITZ THE CAT'S SUPERMOON ADVENTURE



CREATIVE
SUMM

Director/Writer KWON O CHUL CHO HEA SEUNG
Music KIM SU JIN Sound CHO KYE HWAN

KWON O CHUL
ASTROPHOTOGRAPHY

KITZ THE CAT'S SECRET OF THE SPACE STATION



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ASTROPHOTOGRAPHY

Dr. Nyan Meow-It-All Wondrous Aurora



Thrilling trip
to space with
Dr. Nyan!

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CREATIVE
SUMM



RAIZES:

A CULTURAL ASTRONOMY EXPERIENCE IN THE SOUTH OF BRAZIL

Guilherme Frederico Marranghello, Rafael Kobata Kimura, Cecília Petinga Irala, Vera Medeiros, Daniela Borges Pavani, Ana Lúcia Liberato Tettamanzy, Rogério Réus Gonçalves da Rosa, Valdecir Xunú Moreira

The night sky reveals the constellations of the Old Man and the head of the Emu.

We report, in this article, the experience of producing a show about cultural astronomy. The show discusses the relations of two indigenous cultures, Mbyá-Guaraní and Kaingang, as well as the afro-brazilian Candomblé, with nature. These three cultures are some of those who constitute the basis of the culture of the state of Rio Grande do Sul, in the extreme south of Brazil. The working group consists of astronomers, planetarians, anthropologists and indigenous people. The production started with document research, discussions with the represented culture people and finished with a large-scale study about school children's perceptions on the show. The aim of the show was to provide children with information to recognize the importance of afro-indigenous knowledge, which we found in our survey.

INTRODUCTION

According to the last census, published on December 22nd, 2023, the Brazilian population has grown to 203.080.756 people and only 0,6% (1.227.642 people) corresponds to the indigenous population. However, Brazil is a huge country, and this study was developed in the extreme southern territory, in a state called Rio Grande do Sul (RS), a place with 10.882.965 people and an indigenous population around 0,3% (34.184 people).

The socio-historical construction of Brazil's southernmost state is deeply connected to the geographical and biological characteristics of the Pampa biome, which covers 63% of its territory. This biome, also found in Uruguay and Argentina,

transcends the national borders later established, reflecting an ecological and cultural unity that shaped the way of life in southern South America. The figure of the “gaúcho,” as the inhabitants of Rio Grande do Sul are called, has its roots in the traditions of the Indigenous peoples who originally inhabited the region, as well as in interactions with other groups that contributed to the cultural and social formation of the state. This identity also resonates with neighboring countries, forming a regional identity that extends beyond geopolitical divisions.

The settlement of the state is marked by three migratory waves. The first occurred 12,000 years BP (Before Present), characterized by the initial groups of hunter-gatherers who occupied the region, possibly observing and recording the “first sky” over the Pampas. The second migratory wave took place approximately 2,000 years BP, possibly connected to or independent of the ancestors of the native populations of the various Indigenous nations inhabiting the region at the time of European colonization, which marks the third migratory wave in the 400 years BP (17th century) (Oliveira, 2005; Nimuendajú, 2017). The Indigenous peoples who have survived to the present day in the region include groups speaking Tupi-Guarani and Macro-Jê languages, such as the Kaingang and Xokleng. The Tupi-Guarani groups originated in the Amazon, whereas the Macro-Jê groups, like the Kaingang, came from Brazil’s central plateau. These migratory movements significantly contributed to the ethnic and linguistic diversity of the region.

The third migratory wave is also characterized by power and territory disputes between Portugal and Spain since Columbus arrived in the continent, resulting in the death of millions of representatives of indigenous people. Besides that, during the colonization, about 4 million slaves were brought from Africa to Brazil and afro-indigenous cultures have shaped the roots of Brazilian culture, contributing to the region’s ethnic diversity. Interaction between African and Indigenous peoples, who lived under the conditions of coexistence imposed by the colonizers, also occurred in quilombos—remote settlements where Africans escaping slavery sought refuge. In general, communities living far from large cities retain celestial references inherited from these peoples. From the interaction between African and Indigenous peoples under the living conditions imposed by the colonizers, we can say that a “second sky” was established (Museu da UFRGS, 2013; UFRGS, 2024). Brazil is known as a continental country which results in many regional differences. There are hundreds of different indigenous ethnicities in Brazil and the northern region concentrates most of the indigenous population. Also, while Brazil has 55,3% of its total population composed by black people, RS has only 20,6% (IBGE, 2022). However, the cultural roots of our traditions (the RS inhabitants traditions) are marked by the



Figure 1: Map showing the state of Rio Grande do Sul and its borders as well as the cities of Tenente Portela, Nonoai, Aceguá and Viamão, marked with a star. The region of the pampa biome is marked in yellow, as the region inhabited by the Charruas. In green one can find also the pampa biome but originally inhabited by the Guaranís and in brown one can find those from Jê language, as the Kaingang.

presence of afro-indigenous people in our history, shaping our customs, habits, cuisine, religion and much more.

There were, at least, three main indigenous ethnic groups in RS. The Charruas is a ethnic group that was practically extinct in the Brazilian territory, leaving the RS territory occupied by two major ethnic groups, the Kayngangs and the Mbyá-Guaranis. Besides that, a long time collaboration has been developed among some university educators and groups from different indigenous territories. These collaborations led to the formation of this group composed by indigenous people and university professors with backgrounds in astronomy, language and anthropology. The goal of this group is to promote the indigenous culture, keeping the history alive, rescuing lost traditions and bringing it not only to the indigenous but also to the schools through a planetarium show. The purpose of developing a new planetarium show, about the roots (Raízes, in Portuguese) of the traditions of RS people that relies on the cultures of Kaingangs, Mbyá-Guaranis and Africans brought to Brazil.

Furthermore, the most recent educational documents added Cultural Astronomy to the curriculum, explicitly, in fourth and ninth grades (ages of 10 and 15 years-old) (Brasil, 2018). Considering school teachers in Brazil have very poor formation in Astronomy and even poorer in Cultural Astronomy, the planetarium raises its relevance in producing, not only shows, but also support materials that may help teachers to work in their classrooms.

¹ <https://sites.unipampa.edu.br/planetario/files/2022/03/produto-educacional-compactado.pdf>



Considering the potential of a planetarium to preserve cultures and traditions, summed up to its value for education, the main goal of this project was to create a show about cultural astronomy and this show should be capable of being representative of the afro-indigenous cultures reported on it, be important to their cultures as a tool of preservation and being capable of raising awareness of regular school students to the importance of the knowledge of the region's traditional people. Considering our goals, within this study, we intend to answer the following research question: What were the students' perceptions about the cultures and their relation to nature after attending Raízes?

FIRST STEPS



The first contacts of our group with indigenous groups around RS has been established with different purposes and these contacts date from years ago. It made it easier to start the planetarium show project, since a relationship of trust has been already established. These collaborations were based on exchange, not giving anything, but sharing (Lee et. al., 2021). The first investigations to learn more about the cultures have been developed in the cities of Nonoai, Viamão, Aceguá and Tenente Portela, shown in Figure 1. Since there are some cultural and language differences among those groups, even when being part of the same ethnic group, working with groups in this region with cities spread more than 500 km from each other made our view more comprehensive.



It is also common to have more than one ethnic group sharing the same indigenous reservation. From Nonoai, we have a long time collaboration between one anthropologist and the Kaingang community. During this time, it became clear that the Kaingangs have a deeper connection of its culture to what happens below the surface, on the center of Earth than to the sky. A new partnership started with the Kaingang community living in the city of Tenente Portela because two members of the community started studying at the university. This allowed us to have a deeper connection and understand the spiritual origins of the Kaingangs. The Kaingangs, for example, are split into two clans: the Kamé and the Kairú. Kamé is related to the west and the Sun while Kairú is related to the east and the Moon. The traditional paintings, animals and plants are also differently related to each clan. Their traditions are strongly related to the Kikki Festival, where the Kikki is a honey-based drink.



The Mbyá-Guaraní are present in those indigenous reservations but our study was deeply connected to two other groups, located in the cities of Viamão and Aceguá. In Aceguá, we took advantage of the opportunity that we had colleagues already working to build a school inside the reservation to start the new collaboration. An extremely small community that would go to the planetarium to watch the new show. However, the Viamão community brought us much more insights to build the show due to a longer relationship of trust and collaboration. Part of the group already develops activities recovering indigenous knowledge with the community kids (Lovison et. al., 2023).

Figure 2: Inside and outside the house of prayer, meeting the elders.

The Mbyá-Guaranis have a relation to nature (land and sky) where, from their own knowledge: “everything that exists on land, also exists in the sky”. The trees connect land and sky while the birds are responsible for transitions into both worlds. It is inside their house of prayer that we connect to their knowledge. We show, in figures 2, inside and outside the house of prayer. Even though we experienced a night inside the house, we were not allowed to shoot during the ceremony. The pictures also show our meetings with the elders and some constellations.

THE SHOW

It was time to transform the traditional knowledge we learnt into a story to be told inside the planetarium. We decided to connect different cultures with characters related to the protection of the forests. There are many examples in northern, southern, eastern and western cultures of people or spirits dedicated to scare hunters or woodcutters and protecting the forests. Some of these characters have similar characteristics like their hats, a smoking pipe or an amputated limb. In Brazil, the most famous character is called Saci Pererê, a black kid, with a red hat that hops around with only one leg (Rosa, 2013). Even though he is not related to the old man indigenous constellation, they share the same amputated limb. In the african traditions of Candomblé, there is a divinity called Ossaim also has one leg and is the divinity of the plants and the cure. He is also related to the planet Mercury. Considering the different cultures' relation to the protection of the forests, common or similar divinities, their relation to land and sky and the fame of Saci Pererê among the whole population, we build the script.

To create the show introduction we used *World Wide Telescope*, showing Earth from space, landing in a region where, today, we have the RS state, remembering that there were no borders when the first people arrived on the continent, thousands of years ago. The rest of the show was built using the software Blender. Blender is a free software that allows modelling and animation. Besides its technical characteristics, it has a huge community that develops and shares models, content, courses and much more, which makes its use simpler. We have developed our own models for the show, but we also have used and adapted existing materials. The 12min show was developed in a process of discussion with the indigenous community and took about a year of production, in a personal computer.

The show starts inviting the audience to go inside the house of prayer to learn more about the indigenous culture. We introduce the Old Man Constellation, the White Ostrich Constellation and the Tapir Way (Lima, 2005; Moreira, 2015). All of these constellations can be found in the software *Stellarium* and we would love to see them in the main planetarium softwares. The Old Man constellation is composed by Orion, Taurus and the Pleiades (Figure 3). An old man was betrayed by his young wife who planned to escape with the chief's younger brother. The pair decided to cut the old man's leg off so he wouldn't be able to follow them. The White Ostrich extends from the Southern Cross, which



(Top) Figure 3: Screen Capture of Stellarium showing the Constellation of the Old Man; Figure 4: Screen capture of Stellarium, showing the Constellation of the White Emu overlapping the constellation of the Deer; Figures 5: Planetário da Unipampa at the premiere with the Mbyá-Guaraní outside the dome and inside the dome.

is responsible for holding the Ostrich head so it can't eat more eggs, like alpha and beta centaurus, two eggs inside its throat, to Scorpius. The tail of Scorpius forms one of its legs (Figure 4). The Tapir walks over the Milky Way and is called the Tapir Way.

We further introduce the Kaingang relations to the Sun and the Moon with help of the anteater, responsible for teaching the Kaingangs to dance and introducing joy in the Kikki Festival. Ossaim comes next with the help of a kid hopping around on one leg, responsible for scaring people away from the forests. Other protectors are shown before asking the audience: in your culture, who is responsible to protect the forests. The Mbyá-Guarani, Kaingang and Candomblé sections of the show are represented with different colors to make the transitions clear to the audience.

The show was built in Blender, using NASA skymaps, some read-to-use models and building some structures for the show. As the whole show, the soundtrack was also produced by the university staff, building the whole atmosphere of the show. The show premiere had the presence of the Mbyá-Guarani from Aceguá (Figure 5), who approved the show to be shown to general audiences. Even though the Mbyá-Guaranis from Viamão have already seen the show in a mobile planetarium, in their own reservation, to approve it, we also promoted an official launch of the show in the Planetarium in

Figure 6: Mobile planetarium installed in a city and naked eye constellation view.



Porto Alegre, with their presence, as well as govern representatives.

THE MOBILE PLANETARIUM

The first studies and visits to the communities with the intent of producing a planetarium show were made in 2022, while the show production took place in 2023. In the beginning of 2024 we presented the show to the represented communities, in their own reservation, in Viamão and in the planetarium located in Bagé. After their approval, we started to travel with our mobile dome to a central region of the state where the geopark called Roots of Stone is located (Figure 6). This region has a huge petrified forest, the reason for its name. We visited 8 cities, receiving about 6 thousand kids in the planetarium. We also presented a teachers training course to work with cultural astronomy, based on the master dissertation of one of our students, represented in the figure below (Figure 7). We also shared cards about indigenous constellations, also represented in the figure 8. During the visit we also offered night sky telescope observations. The activities are shown in the following pictures.

THE RESEARCH METHODOLOGY

One of the main purposes of the new show was to increase awareness about indigenous knowledge. To investigate our goal, we developed a questionnaire basically asking the audience age summed to five questions about their appreciation for the show and 14 questions about how they understand the different traditional knowledge reported on the show. We collected about 50 respondents from each city to answer the survey right after the show (Total of respondents N=578). The questions were answered in a Likert scale being from 1 (Totally disagree) to 5 (Totally Agree). The validity of the survey was tested with a Cronbach's alpha of 0,989.

It's important to address the primary limitation of this study which only asks the students about their perceptions about the cultures and relations to nature after the show. It was a choice of the researchers, based on the idea of not influencing the audience with questions before the show,



Figure 7: Front cover of the material used in the Teachers Training Course; Figure 8: Sample card of the Indigenous constellations.

however, we do understand that it limits what we can say about the influence of the show itself. Although, the results reflect the students' perceptions after the show, which we consider the most important result.

From April to October we visited 8 different cities that are located in a geopark and are part of an educational program. These cities vary in population from really small cities with 3.000 to 50.000 inhabitants and all of our visitors came from public schools. The main part of the students who answered the survey are 10 to 15 year old kids who answered a printed version of the survey right after watching the show Raizes.

To analyze the results we made use of Pearson correlation which determines linear correlation between two variables. The Pearson correlation varies from $r=-1$ (negative relationship between variables) to $r=+1$ (positive correlation). Between the extremes we can say $|r| < 0.3$ corresponds to weak or no linear relationship; $0.3 \leq |r| < 0.5$: moderate linear relationship; $0.5 \leq |r| < 0.7$: strong linear relationship and $|r| \geq 0.7$: very strong linear relationship.

FINDINGS

The age of the kids and the acceptance of the show are reported in table 1, from where we believe the show was very well received from the audience. The table shows the kids' medium age is 13,75 years old, the main focus of our investigation and that they liked the show, scoring it 4,49 in the Likert Scale. The stronger correlation between two of these variables appears between the score attributed to the question "I like the story" and "I liked the show", being $r=0,52$, showing how important is the story for the final result. Other moderate correlations were found between Visuals and Special Effects ($r=0,42$), Special Effects and the Show ($r=0,40$) and the Music and the Story ($r=0,41$).

The questionnaire also asked about the students' perception about the cultures and their relation to nature. The questions were:

- The indigenous people have a lot of knowledge about nature.
- The indigenous knowledge is as important as the traditional science knowledge.
- It is important to learn more about the indigenous knowledge.
- The descendants of African origin have a lot of knowledge about nature.

- The descendants of African origin knowledge is as important as traditional science knowledge.
- It is important to learn more about the descendants of African origin knowledge.
- People represented in the planetarium show have a lot of knowledge about plants.
- People represented in the planetarium show have a lot of knowledge about animals.
- People represented in the planetarium show have a lot of knowledge about the universe.
- People represented in the planetarium show have a lot of knowledge about the weather.
- People from different origins have different cultures and different values.
- Different people have different cultures and they are all equally important.
- Different people have different sets of knowledge.
- Saci Pererê can be found in different cultures with different names and forms.

The results shown in table 2 indicate that, after the planetarium show, kids believe those traditional culture knowledge are as important as our scientific knowledge. They also understand that different cultures have different ways to look at nature and they are all important. Only questions 2, 5, 10 and 14 had a score a little lower than 4 (but still higher than 3,90) while all the other responses lied over 4 (Agree). We argued that the overall evaluation above 3,90 is a great result, which leads to a final score of 4,15. And, even though some important questions like questions 2 and 5 are among the lowest scores, it is important to remember that they are still very close to 4 (Agree) and the result shall be looked within the other questions, that support a good evaluation of the kids perspectives.

Studying Pearson correlation among the two sets of questions, we found small and moderate correlations when asking about the music or the special effects and the relevance of traditional culture knowledge ($r=0,42$ or less), however, a stronger correlation appears when asking about the script and the show. For example, the correlation between those who liked the story and believe the people represented in the show have a lot of knowledge about the universe is $r=0,42$ (question 9) and about the weather $r=0,37$

Table 1: Kids evaluation about the show.

	AGE	I LIKED THE MUSIC	I LIKED THE VISUALS	I LIKED THE SPECIAL EFFECTS	I LIKED THE STORY	I LIKED THE SHOW
medium	13,75	4,14	4,44	4,47	4,13	4,49
median	13	4	5	5	4	5
minimum	10	1	1	1	1	1
maximum	19	5	5	5	5	5
standard deviation	1,73	0,83	0,75	0,77	0,89	0,73

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
medium	4,35	3,99	4,20	4,16	3,91	4,15	4,21	4,22	4,08	3,91	4,29	4,33	4,26	3,98
standard deviation	0,71	0,94	0,88	0,80	0,96	0,91	0,79	0,76	0,88	0,96	0,86	0,81	0,79	1,07

Table 2: Results obtained from the 14 questions about the represented cultures.

(question 10). Considering the correlation between the question “I liked the Show” and the following 14 questions we found the stronger correlation with questions 3 ($r=0,38$), 10 ($r=0,36$) and 12 ($r=0,33$). And there is no correlation between age and any other question, remembering we applied the test with kids from 10 to 19 years old.

CONCLUSIONS

The main goals of this study were: develop a planetarium show about the afro-indigenous cultures that constitute the roots of the culture of Rio Grande do Sul and to investigate the perception of school kids about the cultures represented in the show. We made use of a survey to collect data after presenting the planetarium show to school groups. Salimpour and Fitzgerald (2024) have described the role of cultures in astronomy education. Retrieving important studies and concepts, they claim that “transduction from a social semiotic perspective is layered and this current work argues that it relies on, or rather is driven by four theoretical frameworks: discernment, affordance, aesthetics and representations”. We now drive our conclusions considering these frameworks.

Salimpour and Fitzgerald (2024) argues that enculturation implies in building up students skills in discernment but they also mention that “discernment defines the competency and fluency of a reader to extract relevant disciplinary information for a particular semiotic resource, or system.” We argue that the fact that kids understand and accept the cultural differences is a reflection of their discernment and enculturation.

Affordance implies the complementarity of the audience and the planetarium show. Salimpour (2021) conceptualizes affordance as “being embedded in the representation by the creator of that representation, depending on the goal of the representation”. Affordance considers the students perception about the show, the understanding of cultures knowledge and our goal of representing these cultures.

The work of Salimpour and Fitzgerald (2024) considers aesthetics in a range that involves the manifestation of “beauty, sublime, experience, knowledge and disciplinary”. The recognition of these ingredients by the students corresponds to an important factor to contribute to their awareness of traditional cultures.

Finally, the planetarium show is full of representations that contribute to the students’ understanding and raising awareness about afro-indigenous cultures that have shaped our understanding about the world. Salimpour and

Fitzgerald (2024) understand that astronomy is not only about graphs and equations, but also about the whole constitution of knowledge and that by studying different cultures’ perspectives we contribute to equity, diversity and inclusion.

The process of creating a new show about the cultural roots of our people started with a confluence of the desires of two groups, planetarians and indigenous. First, we have been asked to help with astronomy teaching in the indigenous territory school. At the same time, we felt the need for a cultural astronomy planetarium show based on our own culture and a few time later, the science support agency of our state released a call to fund scientific research on which we proposed to investigate how kids would perceive a cultural astronomy planetarium show and the cultures described on this show. This financial support allowed us not only to buy a better computer to render the show, but also to travel to the indigenous territory, bring the elders from other cities to talk to us and travel with the mobile dome around the state.

The experience of creating a new show with indigenous people has been an extraordinary experience of cultural exchange on which we engaged grad and undergrad students. Building the show using Blender was also a great learning experience that culminated in, first, presenting the show to the indigenous groups and, second, traveling with our mobile surveying the students’ experience with the show. The results have shown how important the planetarium show can be to raise awareness about afro-indigenous knowledge. However, we would like to emphasize how important it was to have the represented groups acceptance about the show and surveying not only about the school childrens acceptance but, the most important, if the message we’d like to send was correctly received.

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ABSTRACT

We report initial findings from a 2024 global survey of the planetarium community, designed to better understand how climate change and environmental issues are being communicated in dome programming. The survey explored how topics such as sustainability, biodiversity, and local resilience are currently addressed, and what support is needed to expand this work.

This initiative represents a collaboration between the Astronomical Society of the Pacific, Astronomers for Planet Earth, the California Academy of Sciences, the International Planetarium Society, and Associated Universities, Inc. The consortium recognized the untapped potential of planetariums as trusted, immersive venues for addressing the urgent issue of climate change through scientific storytelling.

The survey reached 91 respondents from across 27 U.S. states and 21 countries, capturing a wide range of planetarium types — from planetariums associated with universities and science centers to mobile domes. Responses indicate that planetarians widely support including climate topics in planetarium programming and view Earth as a critical part of the planetarium mission. Many expressed a strong desire to incorporate environmental themes but cited significant barriers: lack of funding, outdated equipment, insufficient staff training, and concerns about audience reactions.

The majority of respondents expressed a need for practical, ready-to-use resources such as climate-focused planetarium media, professional development in climate science and communication, and access to peer support communities. Interest was particularly strong in modular content, training workshops, and assets that can be adapted to local audiences.

Overall, the results reveal both a need and an opportunity: planetariums are well-positioned to foster climate literacy, but they require strategic investment and support to do so effectively and inclusively.

1. INTRODUCTION

Planetariums offer a powerful, underutilized space for engaging communities in climate science. These venues — trusted, immersive, and often beloved within their communities — naturally blend awe with evidence, providing visitors with a comfortable space to explore scientific concepts. Planetarium shows often incorporate planetary science, including examples of extreme climate conditions on other worlds. Venus, for instance, with its runaway greenhouse effect and surface temperatures hotter than Mercury's, despite being farther from the Sun, serves as a compelling cautionary tale in climate education.

Recognizing that climate change and environmental topics can still be contentious in some regions, we sought to understand how planetarians currently approach these issues, if at all, and what support they may need to do so confidently and competently. A short snapshot of our survey (part of a larger project) is presented here. We have aimed to identify common concerns, perceived obstacles,

A FRAGILE BLUE DOT: AMPLIFYING CLIMATE AWARENESS IN PLANETARIUMS WORLDWIDE

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and opportunities for professional development. Our goal is to foster a future where the science of climate change is discussed openly – and effectively – in every dome.

2. HOW WE SURVEYED PLANETARIANS

As the urgency of the climate crisis grows, planetariums are uniquely positioned to help the public understand the science of human-induced climate change and the local solutions that can address it. Research shows that immersive environments like planetariums enhance science communication and public engagement (International Planetarium Society, 2023), making them powerful venues for addressing controversial or complex topics (Falk & Dierking, 2018). Recognizing this opportunity – and the barriers that can stand in its way – an international consortium of science and education organizations came together in Fall of 2023 to learn directly from the planetarium community. This group, including the Astronomical Society of the Pacific, the International Planetarium Society, the California Academy of Sciences, Astronomers for Planet Earth, and Associated Universities, Inc., joined forces to explore how to empower planetarians in discussing climate change confidently, accurately, and effectively.

The consortium began with two virtual town halls that brought together hundreds of planetarium professionals to share their insights, concerns, and aspirations around environmental programming. Building on what emerged in these conversations, the group designed and distributed a comprehensive international survey (in English) to capture the current landscape. From June to November 2024, the survey reached planetarians across a wide spectrum of venues and regions, gathering 91 responses through professional networks, conferences, and online communities. The group reported initial results, based on a smaller subset of responses, at the conferences of the Astronomical Society of the Pacific and the International Planetarium Society (summer 2024).

In addition to general questions about planetarium location, size, equipment, audience types, visitorship, etc., the survey included questions about the planetariums' connections to their local communities (and in particular local climate impacts and solutions), perceived appropriateness of climate and environmental topics in planetariums, current and desired programming on these topics, current obstacles and challenges, and needed support and resources. The findings from this effort aim to guide the development of meaningful professional development opportunities, planetarium media assets, and other resources that respond directly to the needs of planetarians. Ultimately, our goal is to ensure that climate science becomes a welcomed and empowered part of every dome's story.

3. RESULTS

The consortium conducted a survey that reached 91 planetarians and science educators across 27 U.S. states and 21 countries. The survey was informed by two virtual town halls attended by hundreds of educators, where participants shared their experiences, concerns, and aspirations for

including climate-related topics – such as sustainability, biodiversity, local solutions, and resilience – within their programming. The survey aimed to better understand not only what planetariums are doing, but also what they aspire to do, what barriers they face, and what professional development they need to confidently communicate the science of climate change.

3.1 PLANETARIUM AFFILIATION AND GEOGRAPHIC REACH DISTRIBUTION

The responses collected represented a good mix of both formal and informal educational institutions. Planetariums associated with “K-12 schools” or “Colleges/Universities” represented ~29% of our sample (n=26). Nearly two-thirds of Planetariums identified as being associated with “Museums/Science Centers” or as being a “Stand-Alone” facility representing a majority of our sample (n=59, ~65%). Six planetariums (~6%) reported their facility as “Mobile/Planetarium” and likely serve both audiences.

Of the 91 total responses, 56% (n=51) came from the United States, representing a wide array of planetariums in 27 states, with particularly strong participation from North Carolina and California. This coverage included both large public institutions and smaller, community-based domes, reflecting the diversity of the planetarium ecosystem. However, certain regions of the U.S., such as the Midwest, Mountain West, and major states such as Texas and Illinois, were underrepresented suggesting potential issues in communicating the awareness of the survey in these areas.

The remaining 44% of responses (n=40) came from a broad swath of international sites. Notably, the United Kingdom (n=15) provided the largest single response outside the U.S., followed by Germany, Australia, Brazil, Slovakia, and France. The survey captured participation from every inhabited continent, with responses from countries as varied as Colombia, the Czech Republic, Iraq, Oman, and Peru. This global footprint is a strong indicator of international interest in using the dome as a space for environmental storytelling. However, some regions, particularly East and Southeast Asia, Sub-Saharan Africa, and South Asia, were not represented in the dataset, highlighting the need for more inclusive methods (perhaps making the survey available in multiple languages rather than just English) in future efforts.

3.2 ANALYSIS OF SELECTED SURVEY QUESTIONS

3.2.1 CLIMATE & ENVIRONMENTAL TOPICS IN THE PLANETARIUM

To learn what concepts or themes planetarium educators currently cover in their dome, we asked: “Which of the following topics related to climate change and the environment do you currently include or personally wish to include in your planetarium programming?” For each topic, respondents could indicate whether they currently include it, wish to include it, or are not interested. Figure 1 reveals clear patterns of interest and engagement across the five thematic areas.

FIG 1: Which of the following topics related to climate change and the environment do you currently include or personally wish to include in your planetarium programming?

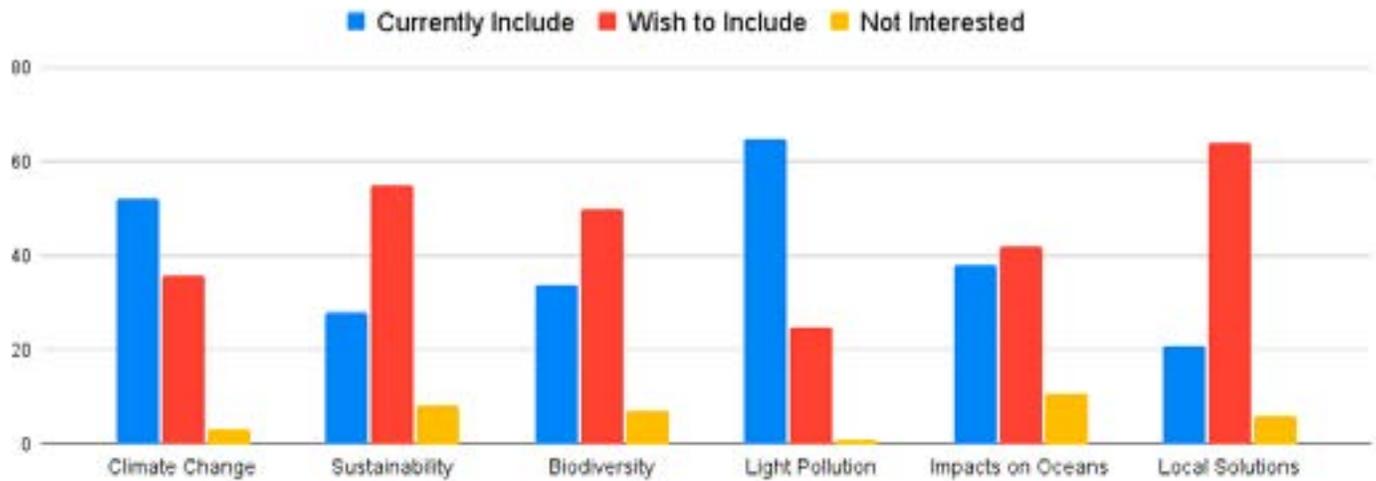
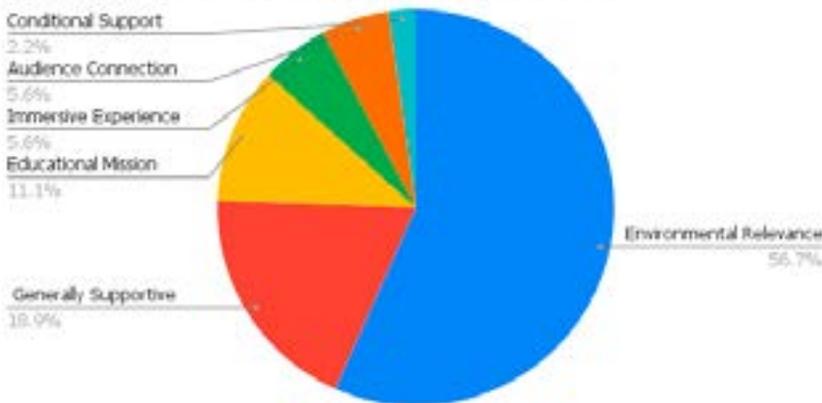


FIG 2: Are Climate Change & the Environment Appropriate Topics to Include in Planetarium Programming?



Across all five themes, the “wish to include” category consistently received the highest number of responses. This pattern is most pronounced in “Local Solutions,” suggesting that while many educators recognize the relevance and importance of these topics, a substantial portion lack the means or opportunity to implement them. For example, “Sustainability” had over twice as many respondents indicating they wish to include the topic compared to those who currently include it, highlighting a significant implementation gap that could be addressed through targeted professional development or content resources.

Topics with higher “currently include” responses — such as “Light Pollution” — may reflect not only stronger resource availability, familiarity, or institutional support, but also a more natural and straightforward connection to core planetarium content. As a phenomenon directly tied to the visibility of the night sky, light pollution serves as a “gateway” entry point for audiences, while also offering pathways to broader environmental and climate-related discussions.

These areas could serve as anchor points or model programs for broader integration.

The “not interested” responses were low across the board, indicating strong overall support among planetarium educators for environmental and climate-related programming. This low level of disinterest, combined with the high aspirational interest, reflects a field that is largely aligned with the urgency of climate communication but requires greater infrastructural and curricular support to act on it. It may also reflect a bias in our sample. A large number of responses with greater geographical representation would help distinguish between these two possibilities.

In sum, the data strongly suggest that educators are eager but under-resourced, and strategic investment in tools, training,

and collaborative communities could help close the gap between aspiration and implementation. These findings provide a compelling rationale for funders, curriculum developers, and institutional leaders to support the integration of climate education in immersive science environments like planetariums.

To understand how planetariums are engaging with pressing global issues, respondents were asked the following open-ended question:

“Do you feel climate change and the environment are appropriate topics in a planetarium? Please explain your answer (why or why not?).”

Ninety responses were analyzed and categorized into thematic areas based on their content (see Figure 2). The results highlight strong support for integrating climate change into planetarium programming, as well as insights into how and why it can be meaningfully included.

A majority of respondents (56.7%, n=51) emphasized that Earth, as “planet one,” is fundamentally part of the planetarium’s domain. These educators argued that since planetariums aim to foster understanding of planets and space, they must also include Earth’s climate and environmental systems. Comments invoked metaphors such as the “blue marble” and the need to steward our “home planet.”

A smaller subset of responses could be categorized as “generally supportive” (18.9%, n=17). These responses conveyed agreement that climate change is appropriate to include in a planetarium setting, but did not elaborate on why. They were typically short affirmations such as “Yes,” “Absolutely,” or “Of course,” which reflect general support without specifying rationale or context. Some educators framed their support around the planetarium’s role in promoting scientific literacy (“Educational Mission”; 11.1%, n=10). They see climate change as central to the mission of education and public outreach, emphasizing that understanding Earth’s systems is a foundational part of space science education.

An equal number of responses could be divided into groups: “Immersive Experience” (5.6%, n=5) and “Audience Connection” (5.6%, n=5). In the case of the former, these responses emphasized the power of the planetarium as an immersive and emotional medium. They noted that the dome environment can create a powerful impact by visually demonstrating changes to the Earth’s climate in a way that fosters empathy, understanding, and engagement. In the case of the latter, these responses focused on the relationship between the content and the planetarium audience. They cited climate change as a “real-life” issue with direct relevance to communities and viewed the dome as a space where meaningful conversations with the public can be initiated.

It should be noted that a small subset of respondents (2.2%, n=2) expressed qualified support. While they acknowledged the importance of climate topics, they raised concerns about delivery, perceived politicization, or whether certain approaches would resonate with or alienate specific audiences. These educators advocated for thoughtful, context-sensitive implementation.

The survey responses to this question demonstrate support for integrating climate change and environmental issues into planetarium programming. Most educators see this integration as both natural and necessary, given the planetarium’s focus on planetary systems and scientific education.

At the same time, a minority highlighted the importance of approach; indicating a need for carefully designed, inclusive, and pedagogically sound strategies. Taken together, the findings support the development of climate-focused planetarium shows, professional development for staff, and resources to help align environmental content with institutional missions and audience expectations.

3.2.2 OBSTACLES AND BARRIERS

To understand what obstacles and barriers the planetarium community faces in offering climate change and environmental topics in offered programming,

planetarium educators were asked: “What are the obstacles / barriers (if any) to including climate change and environmental topics in your planetarium programming?” Respondents could choose from a list of options that applied to their facility but they were also provided with the option of choosing “other” and providing a short response. These open-ended responses were analyzed and categorized into key themes to better understand both the challenges and opportunities facing the field.

In choosing from a list of options that applied to their facility, nearly 57% of respondents (n=52) indicated insufficient funding. Within this theme, budget constraints, outdated equipment, and staffing limitations were common barriers, especially in under-resourced institutions. Respondents frequently cited difficulty accessing appropriate digital assets, media, pre-recorded shows, or up-to-date factual content, as identified by 47% of respondents (n=43). Others mentioned a lack of awareness about where to find quality materials or the need for resources that are both engaging and scientifically robust. A lack of understanding of climate communication best practices was identified as a barrier in 43% of responses (n=39). Educators acknowledged their own or their staff’s limited background in climate science or best practices in science communication, creating hesitancy about tackling such complex and urgent issues in front of an audience. Not surprisingly, a similar number of responses (33% of respondents; n=30) said their staff lack knowledge about climate science. Several educators described lacking time to develop new programs or to attend training. Others highlighted the absence of a professional learning community focused on climate communication within the planetarium field, and few professional learning opportunities in climate

TABLE 1: What are the obstacles to including climate change and environmental topics in your planetarium programming?

AVAILABLE CHOICES	NUMBER OF PLANETARIANS THAT AGREED	% OF RESPONSES
Insufficient Funding	52	57.1%
Not enough access to appropriate assets	43	47.3%
Staff lack climate communication best practices	39	42.9%
Staff lack knowledge about climate science	30	33.0%
Understaffed	32	35.2%
Concerns about controversy / negative audience response	36	39.6%
Lack of opportunities for staff training / professional development	31	34.1%
Inadequate equipment	16	17.6%
Lack of professional community	14	15.4%

education were cited as reasons why. Limited institutional budgets and staff capacity were also common concerns (35% of respondents; n=32). Understaffing, aging equipment, and being embedded in under-resourced institutions such as county or municipal facilities were cited as barriers to expanding programming into climate topics. Perhaps given the contentious nature of human-induced climate change in some regional areas, there are concerns about controversy and negative audience feedback for 40% of respondents (n=36). A lack of opportunities for staff training and professional development prevents 34% of respondents (n=31) from including climate change topics in their programming. Finally, a small but not insignificant number of planetarians identified “inadequate equipment” (n=16, 17.6%) and a “lack of professional community” (n=14, 15.4%) as obstacles to including climate and environmental topics in their planetarium programming.

In response to the open-ended survey question asking planetarium educators to identify additional climate-related topics they currently include or wish to include in their programming, 36 valid responses were analyzed and categorized into thematic areas. The most commonly cited theme was Energy & Solutions, appearing in 9 responses (25.0%), with examples such as “energy” and “Context of Earth as planet in the solar system, demonstration of the global systems that impact climate.” This reflects strong interest in addressing climate solutions and sustainable practices in planetarium content.

Extreme Weather & Disasters and Planetary Context & Space were each cited in 3 responses (8.3%). Planetarians mentioned topics like “impact of hurricanes,” “community resilience,” and “space weather” to highlight both terrestrial and extraterrestrial dimensions of climate impact. For instance, one respondent noted, “Yes, we have a movie that includes a theme about space debris.”

Pollution & Waste and Biomes & Ecosystems each appeared in 2 responses (5.6%). Topics included “satellite pollution” and “seeding of bleaching-resistant corals into threatened coral beds.” Meanwhile, Earth Systems & Feedbacks and Climate Awareness & Action were each represented by a single response (2.8%), including references to “Milankovitch Cycles” and “Action beware climate crisis.”

Despite refining thematic categories, 15 responses (41.7%) remained uncategorized, largely due to brief or ambiguous entries like “none at this time” or general phrases like “Ecosystems.” This high proportion highlights the value of follow-up questions or guided prompts in future surveys to better capture specific interests and emerging topics in climate education programming in planetariums.

The responses to this survey question reveal both systemic and personal obstacles, but also pockets of enthusiasm and readiness. While time, funding, and materials are persistent challenges, many planetarium educators are motivated to adapt and innovate. Support in the form of professional development, centralized access to ready-to-use media assets, and guidance on climate communication could significantly improve the integration of these vital topics.

TABLE 2: What resources, if any, do you and your staff currently have to support you in including climate change and environmental topics in your planetarium programming?

THEME	# OF RESPONSES	% OF RESPONSES
Uncategorized	40	44.4%
Specific Shows, Tools, or Curriculum	14	15.6%
Institutional or Peer Support	14	15.6%
No or Minimal Resources	11	12.2%
Free or Public Resources	11	12.2%

3.2.3 SUPPORT AND RESOURCES

In order to identify both existing supports and unmet needs within the planetarium community, we asked two related questions. We first asked respondents: “What resources, if any, do you and your staff currently have to support you in including climate change and environmental topics in your planetarium programming?” Based on a qualitative analysis of the open-ended responses, Table 2 presents the themes that could be identified.

Unfortunately, nearly half of all responses were too vague, general, or multifaceted to be assigned confidently to one theme. This highlights a need for clearer resource documentation and perhaps future prompts that encourage specific examples. Of the responses that could be assigned, educators reported using specific programs and multimedia tools — such as “Habitat Earth” and “Climate Change in Our Backyard” — to support climate change messaging. These resources form the backbone of many existing efforts (n=14). Just as frequently, however, a significant number of educators noted having few to no resources dedicated to environmental programming. This points to a critical gap in support and infrastructure. Additionally, respondents often rely on free and publicly available content from organizations like NASA, nonprofit educational media, and web-based platforms. While accessible, these resources are not always tailored to immersive environments like planetariums.

For planetariums associated with colleges, universities, or science centers, planetarians described leveraging partnerships with faculty, departments, and institutional colleagues to integrate environmental content. These collaborations often enable local customization and expertise sharing.

To identify what unmet needs exist within the planetarium community, we then asked respondents “What support and resources do you still need in order to include climate change and environmental topics in your planetarium programming?” A total of 89 responses were collected and analyzed (see Table 3).

The insights gained offer a clear roadmap for where investment, collaboration, and innovation can have the greatest impact.

TABLE 3: What support and resources do you still need in order to include climate change and environmental topics in your planetarium programming?

THEME	# OF RESPONSES	% OF RESPONSES
Content and Assets	32	36.0%
Training and Communication	18	20.2%
Funding & Institutional Support	14	15.7%
Community and Collaboration	4	4.5%
Uncategorized	21	23.6%

It is clear that there is a growing interest in integrating climate change and environmental topics into immersive educational spaces. To gauge what specific kind of climate change community efforts would be of value to the community, we asked respondents to indicate their interest in a small range of professional development, media assets, and other resources.

Table 4 presents the combined number of “Very Interested” and “Some Interest” responses for each item. There was interest in all of these potential supports from the majority of participants. The most interest was in modular planetarium assets, from 86.8% of respondents (n=79); followed closely by a workshop on effective climate communication, with 83.5% of respondents (n=76) indicating interest. The item that drew the least interest was a certificate course, yet a majority of respondents (54.9%, n=50) did indicate interest. Each of the remaining items garnered interest from approximately 70% of respondents (see Table 4 for exact numbers); these included a workshop on climate science, climate activities and resources for use outside the dome, and a community of practice. Figure 3 represents the data in a graphical format so that the primary professional development and resources that planetarians are interested in are readily apparent.

In sum, the data from respondents strongly suggest that planetarians are eager but under-resourced, and that strategic investment in tools, training, and collaborative communities could help close the gap between aspiration and implementation. These findings provide a compelling rationale for funders, planetarium asset developers, and institutional leaders to support the integration of climate education in immersive science environments like planetariums.

4. CONCLUSIONS

Planetariums — uniquely immersive, community-centered learning spaces — are well-positioned to engage the public in climate literacy, provided they are equipped with the right tools and backing. Planetarium professionals who responded to this survey are eager to include environmental content, but many face barriers due to limited resources. Strategic support — through funding, partnerships, and curated content—could significantly enhance the reach and quality of climate change education in these powerful learning spaces.

TABLE 4: Which of the following professional development and resources would be of interest to you and/or your planetarium staff? The results below indicate the combined numbers of “Very Interested” and “Some Interest” responses for each item.

TYPE OF PROFESSIONAL DEVELOPMENT OR RESOURCE	# OF RESPONSES	% OF RESPONSES
Workshop on climate science	65	71.4%
Workshop on effective climate communication	76	83.5%
Certificate course on climate communication in planetariums	50	54.9%
Modular planetarium assets related to climate and environmental topics	79	86.8%
Climate activities and resources for use outside the dome (e.g. pre/post visit).	64	70.3%
Community of practice for climate communication in planetariums	62	68.1%

The survey results offer a valuable snapshot of the current landscape of climate communication in planetariums. Key strengths of the dataset include:

- Geographic breadth, capturing perspectives from institutions operating in diverse political, cultural, and ecological contexts.
- Engagement with both formal and informal education audiences, reflecting a range of institutional missions.
- Clear expression of unmet needs—from resource gaps and staff confidence issues to perceived audience resistance in some communities.

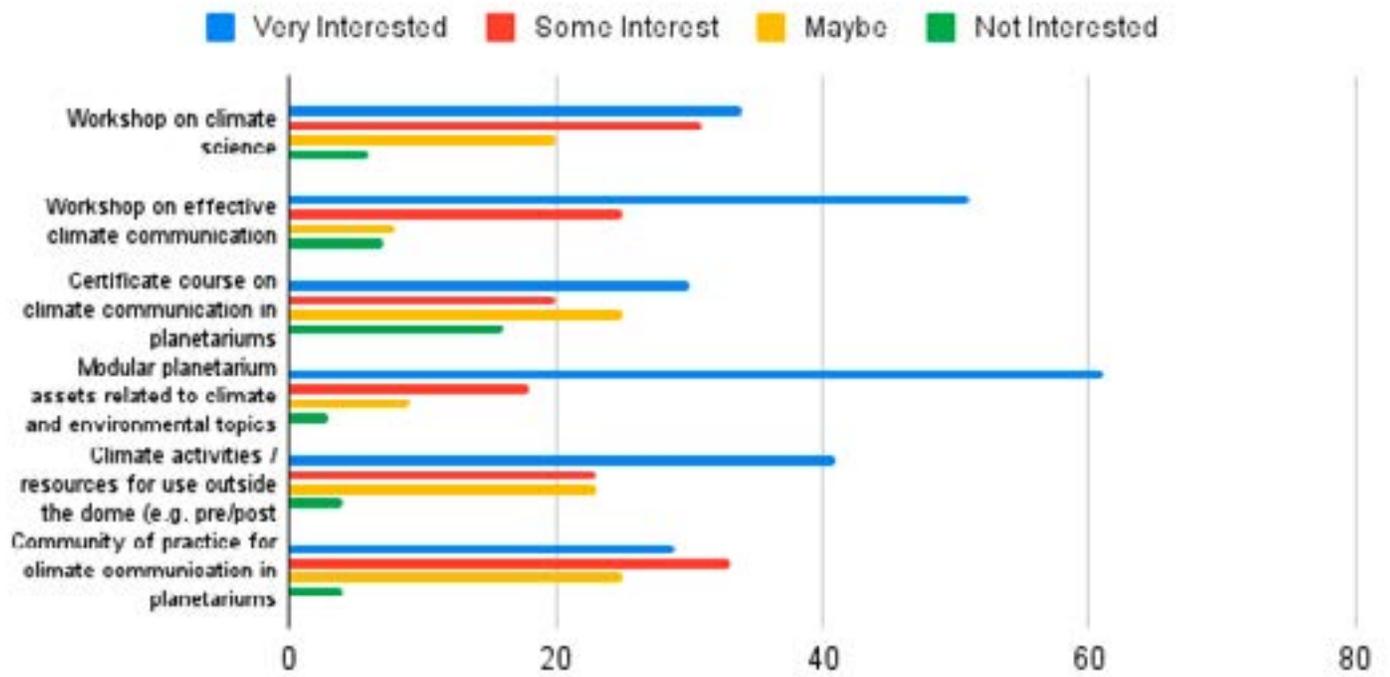
Most importantly, the responses underscore a widespread desire for modular multimedia assets and professional development that enables planetarians to address climate change accurately and appropriately, while tailoring their messaging to local contexts. Respondents consistently voiced a need for training, curated content, networking opportunities, and examples of effective climate programming.

4.1 LIMITATIONS AND OPPORTUNITIES

Despite its strengths, the dataset also reflects some inherent biases. The overrepresentation of Anglophone countries, especially the U.S. and UK, suggests that distribution channels primarily reached English-speaking networks. Moreover, the absence of voices from highly climate-vulnerable regions—such as the Pacific Islands, coastal Southeast Asia, and parts of Africa—limits the scope of the insights.

Nevertheless, this survey provides a strong foundation for informed action. It reveals a committed community of educators who are eager to do more but lack the tools, institutional backing, or peer support to fully realize the potential of climate communication in their domes.

FIG 3: Which of the following professional development and resources would be of interest to you and/or your planetarium staff?



4.2 NEXT STEPS

This global survey represents a critical step toward building a stronger, more connected, and more climate-literate planetarium community. The findings point to a clear opportunity for the IPS to support:

- The creation of professional development and communication resource toolkits;
- The development of modular, media-rich planetarium assets (ideally at low-to-no cost to planetariums) that can be locally adapted;
- The launch of peer-learning communities around climate storytelling in domes that will encourage collaboration and open-resource sharing between planetariums;
- Provide funding pathways for smaller or under-resourced institutions as well as the expansion of outreach to underrepresented regions to ensure global inclusivity.

Given the international composition of the International Planetarium Society, and the danger imposed by human-induced climate change is global, efforts should be made to include other languages besides English to maximise these goals and tools. By investing in the professional capacity of planetarians, we can unlock the full power of these immersive environments to inspire science-informed action on one of the greatest challenges of our time.

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“Knowledge has to be improved, challenged, and increased constantly, or it vanishes.”

— Peter Drucker

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Planetarium Leader Eric Larez in action.

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A WEEK WITH THE GDP

Dário Fonseca

Hemispherium @ UC Exploratório in Coimbra, Portugal

Stones and stars, Earth and Sky.

PART 1: I REALLY WANT TO BE THERE!

When I first learned about this professional development program, a few years ago at the IPS website, I honestly didn't think I had much of a chance to be selected for it. I didn't know much about the planetarium community outside my own country, other than brief interactions on Dome-L.

The recent pandemic closed many doors, yet it opened new ones. Many conferences and symposiums I could never afford to attend became online meetings for free or substantially reduced fees. I was finally able to meet and talk to planetarians from all around the world and discovered a vibrant, engaged community of wonderful people I could learn from and share my experience with. I joined the International Planetarium Society and participated in the largest online gathering of planetarians ever.

Fast forward a few years... the program for 2024 was even more enticing, with the possibility to have the visit scheduled next to the IPS meeting which would happen in both cities of the host planetariums, Berlin and Jena, and celebrate the Centennial of the Planetarium.

Even so, I had decided to postpone my application to another year for personal reasons, but a post by Susan Button, the day before the deadline (31/12), made me realize many pieces had since clicked together and it became again possible to participate during this special year.

So I wrote the letter, updated my CV, recorded the mp3 with a story I had been working on, edited (most of) the barking dogs out, asked a couple of friends for the reference letters and sent it all to Tilo Hohenschlager just before leaving home to celebrate the new year with my family.

PART 2: GETTING THERE!

Soon after receiving a very nice letter from the GDP informing me I had been selected to visit Stiftung Planetarium Berlin, I contacted my host's representative – Anna Green. We had already met online on several occasions and it was nice to meet her again. Even though she was very busy as one of the organizers for the 2024 IPS conference, adding to her duties on the INTENSE mobile planetarium program, it was easy to schedule online meetings to discuss the details of my visit.

As it turned out, the WwtGDP program would make it easier (more affordable) for its recipients to participate on the IPS conference, as long as the visit was scheduled for just before or just after the conference. With that in mind, we settled for the week just before the conference, meaning I would arrive at Berlin on July 10th.

We also talked about the presentations I would have to do... themes, technical issues, audiences... even the possibility to have one of the presentations in Portuguese, as there's a large Portuguese-speaking community in Berlin.

PART 3: THERE!

The journey to Germany was smooth, though a medical emergency during the flight caused it to arrive earlier than

expected at BER airport. Even so, Anna was already there expecting me!

She guided me all the way to the hotel, which took a train and a tram ride to reach, while sharing valuable information about how things work in Berlin and Germany in general. After helping me check in, we took a short walk to the Zeiss Großplanetarium so I could get my bearings for the next few days. My day had been long and the hot weather both in Portugal and Berlin made it specially exhausting, so we called it a day... grabbed some food on the way back to the hotel, made a video call home and had some rest.



PART 3.1: ZEISS GROßPLANETARIUM

Thursday morning, at 10:00, I was meeting Jürgen Rienow at the Zeiss Großplanetarium. After a brief chat he gave me a tour of the building, introducing me to all the team members we happened to pass by. The tour then went through the production room, where I was assigned a desk so I could work on my presentation (the blue backpack marks the spot), and ended under the big dome, where the show “Chemistry of Life” was about to start.



I sat (as a spectator) by the console while the moderator introduced the show to a full audience and was quite surprised by the depth of the introduction: it was a chemistry lesson! Everyone seemed to enjoy it and I expanded my german vocabulary by learning the word for hydrogen. After the show, Linus, the moderator for that session, surprised me by speaking in Portuguese!

A closer look to the Universarium starball, the video projectors and other equipment beneath the dome preceded the return to the

production room. There, Jürgen gave me a key that would allow me to access the staff areas of the building and we discussed the technical details of my presentation.

PART 3.2: THE PRESENTATION

For my presentation, I had decided to expand on the story that I had recorded for my application to the program. Inspired both by the “Planetarium 100” celebration and the planetarians’ conference soon to happen, I framed the story as part of the story of a hypothetical prehistoric planetarian, connecting past and present with our common excitement and awe for the sky above us.

As for the title and short description, this is what I came up with:

Stones and Stars, Earth and Sky - a planetarium show on planetariums, planetarians, ancient traditions and, perhaps, some cheese.

Prehistoric monuments built with large carved rocks dot European and Asian landscapes. Recent and ongoing research suggests there was an astronomical purpose for their construction as the first permanent structures built by mankind to be replicated on a continental scale. We are now just beginning to connect the dots of a story that could be ours, from mountains to stars.

This meant creating a whole new show from scratch... I had some fish-eye photos of places in Portugal and found a few online from astronomically significant places in Europe that would help create the narrative. For the explanation of key astronomical concepts and their connection to the monuments I relied on the simulation software of the host planetarium.

I had never used Digistar before, having only seen the interface in a few online demonstrations focused mainly on live presentations. Jürgen kindly showed me the basics not only of the main console but also of the scripting language. The show would begin with a sequence of fish-eye images, so he taught me how to script those in.



Playing around with the interface, browsing the documentation and finding the right syntax and parameters with the help of auto-complete, I quickly realized I could also script some of the astronomy sequences I had planned, with the occasional question to Jürgen or Alma when something didn't go as I expected.

After about one and a half day and some coffee cups I had most of the presentation already scripted, missing only a few images I had, meanwhile, decided to change and most of the timing details for which I would need to rehearse.

In the mean time I was invited to a staff preview of a fulldome show they were considering adding to the program, and there I met Tim Horn, the president of Stiftung Planetarium Berlin.

PART 3.3: BERLIN



Saturday was spent sightseeing and walking around in Berlin. Alexanderplatz and Museum Island in the morning, a Berliner Currywurst by the river for lunch and then a somewhat random tram travel that would take me east, near a park by the Spree river. The weather was nice, not too hot, and

I was in the mood for walking. I figured I had enough time to walk all the way to Treptowerpark and Prenzlauer station where I would meet Anna later on.

The walk turned out to be a bit longer than I expected, but I got to see how berliners make good use of their rivers and parks... lots of families, many outdoor activities, even a music concert from a boat!

Meeting Anna at Prenzlauer at the agreed time, we then walked some more to a nearby park, once an amusement park with an amazing story on its own (which I won't tell... go there with Anna if you want to know it). We had dinner there and then walked to the Archenhold Sternwarte where I would participate at "Night in the observatory" programme.

There I met new friends, got a private tour of the museum and the historic observatory, visited the small (Klein) planetarium, marveled at the giant refractor and took part in the public observing session.



The most interesting telescope was, without doubt, the 500 mm Cassegrain reflector in one of the domes. I liked the way the moderators described the telescope, its parts and their functions and then motivated the

visitors to operate the telescope on their own. There were also binoculars and two 8" dobson telescopes outside, which the visitors could also use freely.

For some reason, the moderators left the instruments outside unattended for long periods, and I noticed the visitors, though curious, didn't try to use them,

Even when they had to wait before entering the observatory dome. So I put on my (virtual and unofficial) moderator hat and helped them point the telescopes, guided them to some



interesting celestial bodies and gave some tips on how to photograph the Moon with their smartphones. I also used my green laser pointer to help them identify some stars and constellations they asked about.

The day ended with a nice conversation about astronomy, on the bus, with a Hungarian student who stayed to the end of

the activity.

Anna, not busy enough with the organization of the IPS conference and wanting me to get the most of my Berlin experience, proposed we met for lunch on Sunday on a park by the west side of Berlin. I got there a bit early and found a flea market next to the train station. Bought a book about Mercator and a plate with a steam locomotive painted on it. Had my eye out for camera lenses but didn't have any luck as the most interesting ones were in rather poor condition. We ended up going elsewhere for lunch and, after a short visit to another, larger, flea market we settled for pizza.

The afternoon was rainy so I went back to the hotel and polished my presentation a bit.

PART 3.4: ARCHENHOLD STERNWARTE



Monday was the scheduled date for the first presentation at the Archenhold Sternwarte. There were group visits scheduled which included planetarium sessions, so I had to wait for the pauses between sessions to load and prepare my own sessions on the planetarium's Digistar system. I took that time to follow the groups around the museum, observe how the moderators interacted with the visitors and even watch a planetarium session. I also found a few items of particular interest, like a LEGO reflector telescope or a picture of a meteor detection system controlled by a ZX Spectrum computer.

I was expecting to have more time after lunch, but an electrical problem took the planetarium equipment offline for a while. Stefan helped me getting everything ready in time.

Everything was set, but then... Anna told me there would be no session that day as no one had registered for it.

The following day I tweaked some of the images (darkened some less interesting areas to reduce cross-bouncing) and

(Continued on pg. 54)

As realistic as possible

Starry Sky with Landscapes

An opto-mechanical projector **MEGASTAR**

Stars that overlap mountains or buildings are naturally hidden

Stars at the zenith shine brightly, while stars near the horizon are hazy in the atmosphere

Stars at the zenith are still, while stars near the horizon are more twinkling

Solid-state shutters - electronically controlled

Automatically dim/turn off stars that are overlapped on digital landscapes or images



Even the atmospheric effects (atmospheric extinction)

Stars brightness can be freely controlled according to the altitude, enabling the reproduction of all kinds of sceneries, from hazy or clear starry skies, starry skies with clouds and buildings, to the unblinking starry skies of outer space.

ADVANCED FUNCTIONS ONLY AVAILABLE ON MEGASTAR

It can reproduce the differences due to the season and weather conditions.

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MEGASTAR-IIA
Dome: 10-25 m, flat / tilted



MEGASTAR-IIA
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Dome: 10-25 m, flat / tilted



MEGASTAR-Neo II
Dome: 4-10 m, flat / tilted



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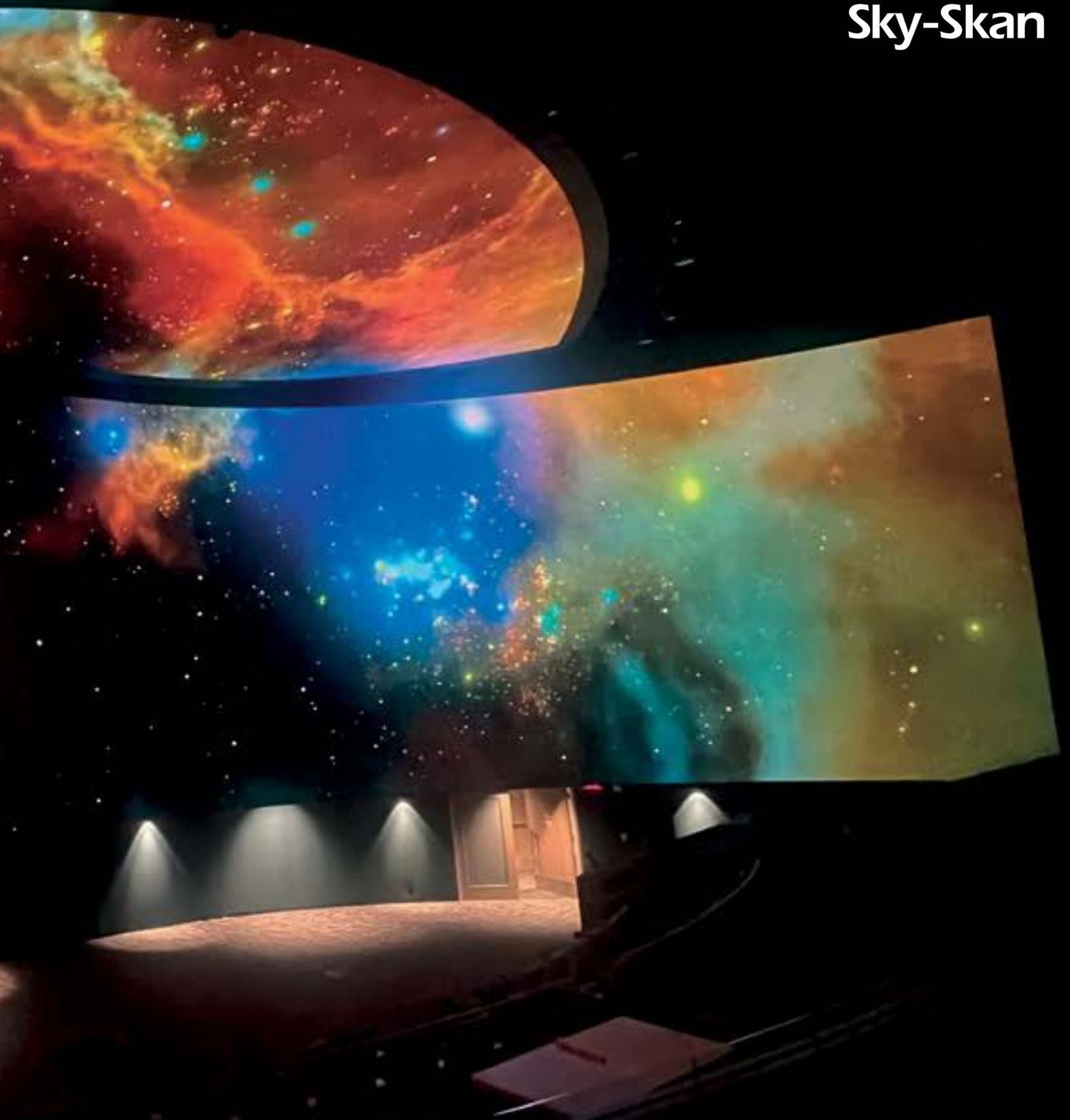
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FIRST AWARDING OF THE SEBASTIAN THIELE MEDAL AT THE ANNUAL CONFERENCE OF THE SOCIETY OF GERMAN-SPEAKING PLANETARIUMS (GDP)

It was a moment of silence, gratitude and deep solidarity: at this year's conference of the Society of German-speaking Planetariums (GDP), the Sebastian Thiele Medal was awarded for the very first time on 6 April 2025 - an award that not only honors voluntary commitment but also keeps the memory of a valued colleague and friend alive. Sebastian Thiele (Cottbus Planetarium) died suddenly and unexpectedly last year at the age of just 40. This news hit everyone who knew him hard during the IPS Conference 2024 in Berlin. Sebastian was due to take over the management of the planetarium in Cottbus from his father (Gerd Thiele) this year and had been a member of the GDP Board since 2019.

The newly created award recognizes outstanding commitment and special services to promoting the positive image of planetariums in society.

Tobias Wiethoff from the Bochum Planetarium was the first recipient of the medal. With his tireless and creative efforts, he almost single-handedly produced the show "100 Years of Eternity" to mark the Planetarium Centennial and thus set a special example. This show has already been translated into several languages and is being presented in many planetariums around the world. Tobias Wiethoff has significantly supported GDP with the distribution of the show. The whole society is very grateful to him for this.

A moving moment was when Gerd Thiele was honored as an honorary member of the GDP. Unfortunately, he was unable to accept the medal in person. In his place, the award was presented to Patrick Smialowski, who will take over the management of the Cottbus Planetarium in May. The society thus honored not only the merits of its honorary member and founding President Gerd Thiele, but also the memory of his son, whose work in the planetarium community remains unforgotten.

Two long-time companions of the society were also honored at this festive event: Axel Krieger (Schwaz) and Inga Schlesier (Halle/Saale), who stepped down from their positions after many years of dedicated work on the GDP board. They received the award as a symbol of sincere gratitude for their energy, commitment and inspiration, which they also used to shape and mold the GDP.

In future, the medal will be awarded annually. The total number of prizes to be awarded is limited to 50, which will make its significance in the minds of all even more valuable in future.

The first award ceremony was therefore more than just an award - it was a moment to pause, a space for gratitude and remembrance. It showed how much dedication goes into the day-to-day work of our planetariums - and how strong the bond is that unites us all: our love of the stars and the people who tell their stories



A SYMBOL OF REMEMBRANCE AND APPRECIATION

Dr. Andreas Schmidt

Member, GDP Board

(From top) From left to right: The award winners Tobias Wiethoff, Inga Schlesier, Axel Krieger, Patrick Smialowski on behalf of Gerd Thiele and the President of the GDP Dr. Björn Voss. (Photo: Katrin Keym); The Sebastian Thiele Medal awarded by the Society of German-speaking Planetariums (GDP). (Photo: Dr. Andreas Schmidt)

The Stars Were Just the Beginning

Andromeda Mission Control.
Intergalactic Probe 7 approaching
the Milky Way.



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galactic core.



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black hole theory. Light source of the
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Mark Percy

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UNDER THE CLASSDOME

An NGSS Approach to Learning for the Hertzsprung-Russell (H-R) Diagram and Stellar Life Cycles

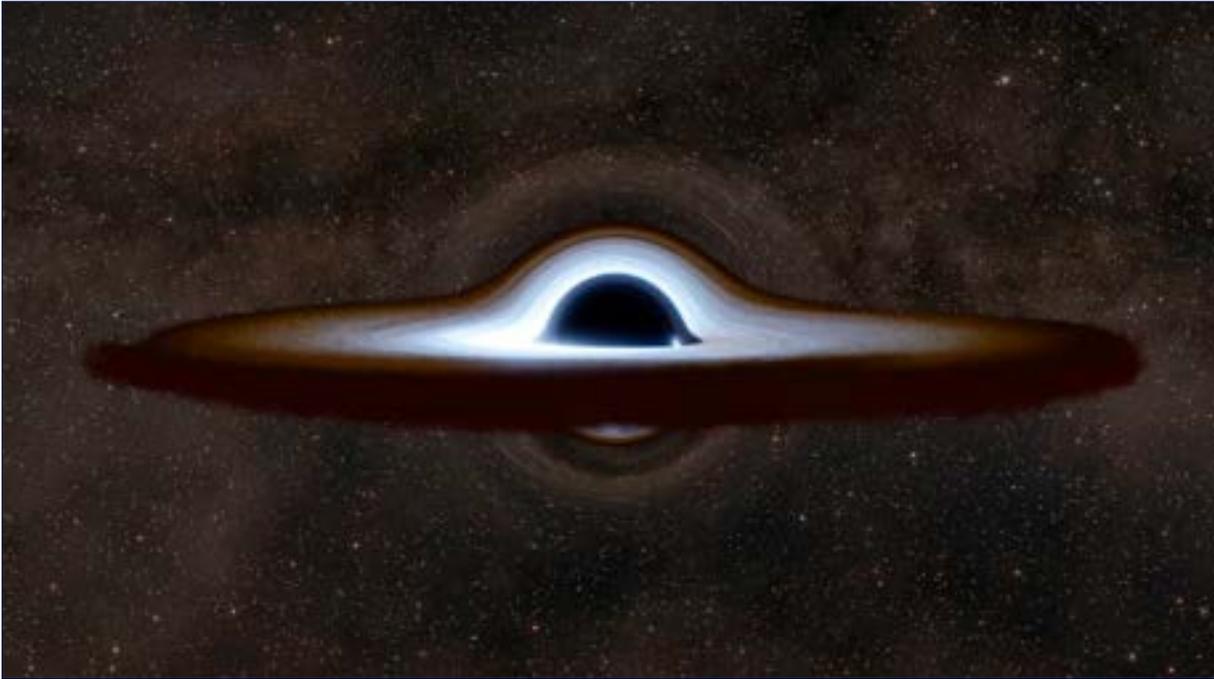


Image courtesy
NASA Scientific
Visualization
Studio

The Next Generation Science Standards (NGSS) are being implemented for high school (ages 14-18) in New York State beginning with Earth and Space Sciences this coming fall. Teachers in my school district have been participating in professional development to prepare. One of those teachers and I have formulated a plan to create some new lab experiences for the planetarium. The most fundamental difference that the NGSS calls for is having students work with models and data that will lead them to key understandings rather than just telling them stuff. Our planetarium is a great place to demonstrate astronomical phenomena, but how do we use it to teach with this new methodology?

One of my older labs about star classification and the H-R diagram is our first project. In the existing lab, I use an incandescent light bulb and diffraction grating glasses to demonstrate the color-temperature relationship. I then use the digital system to morph the sun into various stars. The kids can apply their new understanding by telling me which stars are hotter and cooler based on the colors while they also observe that the size and energy output of a star is independent from the color.

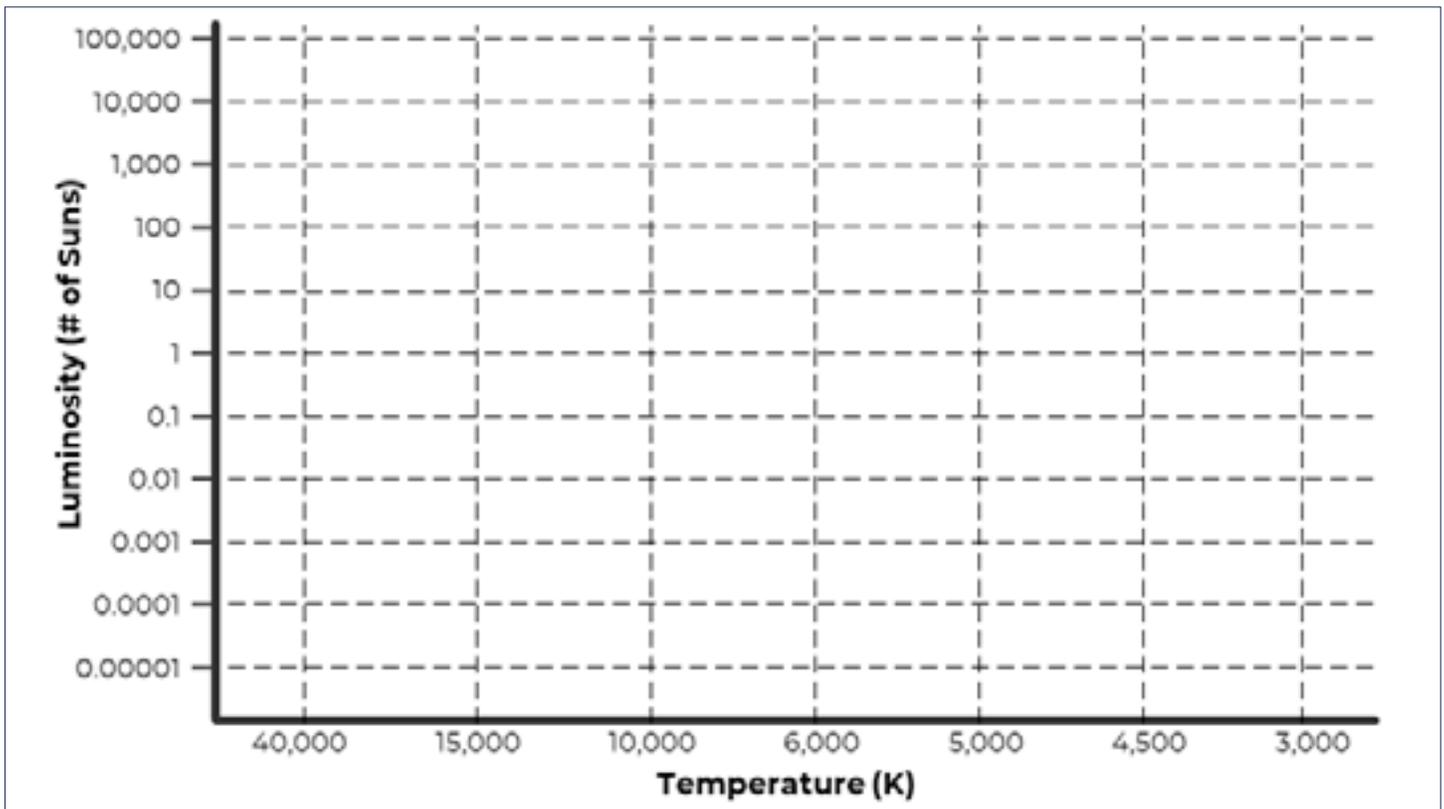
A second way I demonstrate that size determines energy output is by illuminating a 40 watt incandescent lamp and a small incandescent pilot light at the same time. They can clearly see that the 40 watt lamp is emitting much more light than the pilot light even though they are the same color and therefore the same temperature. (I also have a little fun introducing the term “luminosity” and I dare them

to use the word at dinner that night to see their parents’ reaction to their new fancy vocabulary.) Now they are ready for the Hertzsprung-Russell diagram. Luminosity on one axis and temperature on the other one displays these two fundamental properties of stars.

From that point on, however, I’m pretty much lecturing. I explain what it means for a star to be on the main sequence or not, and I show some video clips while I explain how stars are born and how they die. I also explain that big stars are like rock stars that live fast and die young, while small stars sip their fuel and live much longer. The two key principles that we want to get into their heads with the new approach are that (1) small stars live longer than large stars and (2) what happens when they run out of fuel depends on their initial mass.

The latest update to my planetarium software includes a slew of volumetric models that make for great “eye candy” to keep them interested. The plan is to begin with a star forming nebula slowly rotating on the dome. I can create new stars in the software too. Five stars will emerge from the nebula. There will be a tiny red star, a small orange star, a medium yellow star, a large white star and a giant blue star. The students will be asked to record the initial mass, color, temperature and luminosity of each star. That data will be in text below each star.

We will then take nine more steps forward in time. At each step, the kids will record how much time has passed since the stars were born and the color, temperature and luminosity for each star. I will adjust the color and scale



Original axes by Joe Cosette, used with permission, modified by the author

of the stars with each step. The small stars will stay pretty much the same for the first several steps, but the giant blue star will be replaced by a supernova explosion and then a black hole at time = 0.1 billion years (BY). The large white star dies next at time = 1 BY, but will result in a neutron star after the supernova. I found some great full-dome black hole, supernova and neutron star animations to use for the demise of the large stars.

At time = 5 BY and 10 BY, the three remaining stars will be pretty much the same except for small increases in temperature and luminosity. Our yellow sun-like star turns into a red giant at time = 15 BY and is a white dwarf at the next time step to 20 BY. A planetary nebula volumetric model will illustrate the transition to the white dwarf stage.

Because the smaller stars live so long, I am going to take some giant leaps for the last two times. At time = 50 BY, the small orange star will be in its red giant phase. The last step at time = 100 BY will have that star as a white dwarf, but our tiny red star will just be a little hotter and brighter as it was with each previous step.

I simplified the data as much as possible while still clinging to realistic scenarios for the life and death of each star. Collecting the data will be a bit laborious for the kids, but the stunning visualizations that I can now incorporate into the lab should keep their interest. The real challenge is the graphing. I made a graph for each data set and realized that I had to tweak not only the numbers, but the graph itself. Much of the data winds up being tightly spaced. Furthermore, how does one plot six or seven data points that

are pretty much right on top of each other? Shapes around each point would just turn into a mess. Color coding would be confusing because the data points would be different from the stars' colors. I'm going to try having them plot a point and then make an accompanying arrow to the point with the associated time. It will still get pretty crowded, but I don't have a better option...yet. (Got a suggestion? Email me!) I also realized that the graph needed to be more than just axes. Dashed horizontal and vertical lines should help them plot their points more carefully.

If the data doesn't "hit them between the eyes", then a number of follow-up questions should be asked. They'll answer questions about which star lived the longest and shortest, and if there is a relationship between lifespan and initial mass. Questions like "what will happen for a star of initial mass of X..." will require them to apply that relationship. We'll also ask them what the fate of the Sun is based on what they now know. We haven't tried this out with a cohort of students yet, so wish us luck! I hope this achieves our teaching objectives through working with the data to discover the relationships as the NGSS intends.

I want to wrap up with a note of gratitude. When I was new in the field, animations were rare and difficult to work with. I won a Sky-Skan animation laser disc during the door prize session at a conference in the early 2000s and it was like winning a bar of gold for a small school planetarian! Now, Sky-Skan's Dark Matter is loaded with volumetric models and free animation clips are available to all thanks to the European Southern Observatory, The NASA Scientific

Visualization Studio and NOIRLab. A huge thank you to our friends that work in those organizations for creating and sharing so many resources that I could incorporate with this new lab experience.

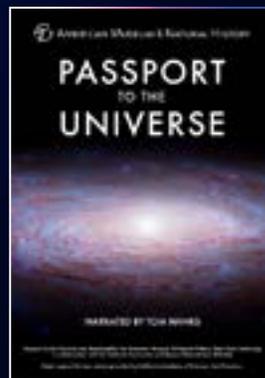
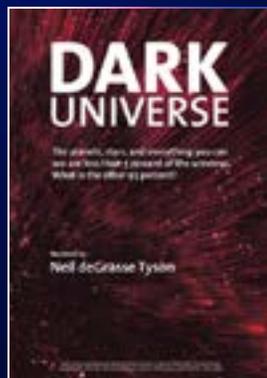
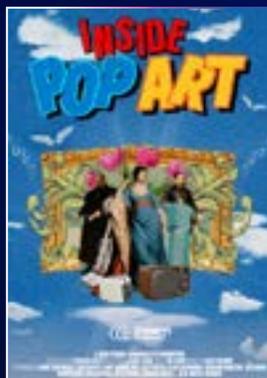
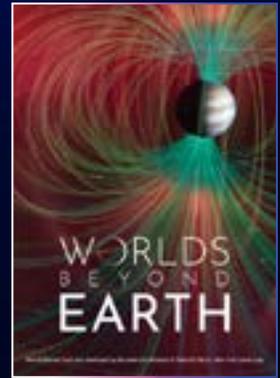
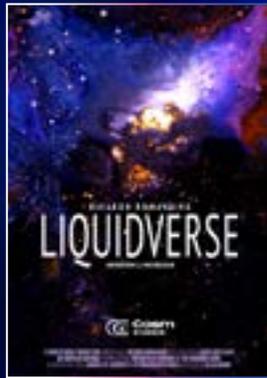
Stellar Life Cycles Lab Data

STAR DESIGNATION		A	B	C	D	E
Initial Mass		0.25M \odot	0.5M \odot	1.0M \odot	5.0M \odot	10M \odot
Time = 0 years (1)	Temp	3000 K	4500 K	6000 K	10,000 K	30,000 K
	Color	Red	Orange	Yellow	White	Blue
	Luminosity	0.0001	0.001	1.0	100	10,000
Time = 0.01 BY (2)	Temp	3000 K	4500 K	6000 K	10,000 K	30,000 K
	Color	Red	Orange	Yellow	White	Blue
	Luminosity	0.0001	0.001	1.0	100	10,000
Time = 0.1 BY (3)	Temp	3100 K	4600 K	6100 K	11,000 K	
	Color	Red	Orange	Yellow	White	Black Hole
	Luminosity	0.0001	0.001	1.0	150	
Time = 1.0 BY (4)	Temp	3200 K	4600 K	6200 K	3000 K	
	Color	Red	Orange	Yellow	Red Giant	
	Luminosity	0.0001	0.001	1.0	1000	
Time = 5.0 BY (5)	Temp	3300 K	4700 K	6500 K	100,000 K	
	Color	Red	Orange	Yellow	Neutron Star	
	Luminosity	0.0001	0.002	1.5	0.00001	
Time = 10 BY (6)	Temp	3400 K	4800 K	7000 K		
	Color	Red	Yellow-Orange	Yellow-White		
	Luminosity	0.0001	0.003	2.0		
Time = 15 BY (7)	Temp	3500 K	4900 K	3000 K		
	Color	Red	Yellow-Orange	Red Giant		
	Luminosity	0.0001	0.004	100		
Time = 20 BY (8)	Temp	3600 K	5000 K	8000 K		
	Color	Red	Yellow-Orange	White Dwarf		
	Luminosity		0.005	0.001		
Time = 50 BY (9)	Temp	3800 K	3000 K	8000 K		
	Color	Red	Red Giant	White Dwarf		
	Luminosity	0.0002	10	0.001		
Time = 100 BY (10)	Temp	4000 K	8000 K	8000 K		
	Color	Orange	White Dwarf	White Dwarf		
	Luminosity	0.0003	0.0001	0.001		
Lifespan		> 100 BY	50 BY	15 BY	0.1 BY	0.01 BY
FINAL STAGE TYPE		SMALL RED STAR	WHITE DWARF	WHITE DWARF	NEUTRON STAR	BLACK HOLE

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GET A QUOTE

INTERNATIONAL NEWS

Dear fellow planetarians...

Below you'll find many inspiring examples of planetarium shows, events, activities, books and free material on the internet. You'll also appreciate how planetarians benefit from meeting each other across nations - and across borders - to exchange ideas and experience. For this section I'm indebted to contributions from Ignacio Castro, Andrew Kerr, Amie Galagher, Alexis Delivorias, Andreas Schmidt and Loris Ramponi.

Let's start this tour around the world in Mexico.

ASSOCIATION OF MEXICAN PLANETARIUMS

The General Directorate of Science Dissemination (DGDC) from Mexico's National Autonomous University (UNAM) recently produced a documentary titled *Under the Eclipse Shadow of the 8 April 2024 event in the city of Mazatlan, Sinaloa*. It narrates the scientists' passion for the great event and the opportunity to carry on previous research as well as during the eclipse totality; it also shows how institutions with different backgrounds, presented science dissemination activities providing the population with the enjoyment of the event without risk. The audiovisual has been available free of charge to everyone who would like to exhibit it on condition that the first exhibit was presented on April 8th 2025 to commemorate the eclipse anniversary, after this date it may be exhibited provided it is not edited and respecting the original credits in case it is used as a reference. The documentary will be accompanied a digital card, which is also free, where you can download educational resources about eclipses. The documentary is narrated in Spanish.

An enthusiastic response was received from several institutions, amongst them at least 10 Southeastern Mexican Planetariums: Cancun, Chetumal, Playa del Carmen, Tapachula, Merida and others, mainly since the total solar eclipse was partially seen in these locations, giving them the opportunity to project the documentary to their audiences. Other sites like UNAM's TV channel, and its state campuses, and Astronomy Research Institutes in Mexico City through 225 Pílares Cultural Community Centers, used the documentary as well as in science museums and Astronomy Associations throughout the country and international sites in Spain, Peru, Costa Rica and Panama. For more information contact Pedro Sierra Romero at DGDC Audiovisual Production Sub-Directorate, e-mail: psierra@dgdc.unam.mx.

PACIFIC PLANETARIUM ASSOCIATION

A booklet on how we know the Universe is old, written for teachers, students, and the public, was issued jointly by the American Astronomical Society and the Astronomical Society of the Pacific some years ago. A PDF copy is still available and can be shared with anyone at: https://aas.org/files/resources/An_Ancient_Universe.pdf. Written by a small group of astronomy educators, the booklet is entitled *An Ancient*



Lars Petersen

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Rødning, Jels, Denmark

lpd@jels.dk

Universe: How Astronomers Know the Vast Scale of Cosmic Time. At a time when science is again under attack, you may find this useful in your outreach work.

For the two eclipses of the Sun visible from North America in 2023-24, a project funded by the Moore Foundation enabled astronomers to distribute 6 million eclipse glasses and information booklets through 15,000 public libraries throughout the U.S. The full story of the project and its effects (including the unexpected creation of student eclipse ambassadors) is summarized in an article by Andrew Fraknoi and Dennis Schatz, just published (open-source) in the *Bulletin of the American Astronomical Society*: <https://baas.aas.org/pub/2024n9i037/release/1>

18 February marked the 95th anniversary of the discovery of Pluto by Clyde Tombaugh at Lowell Observatory. To read his first-person narration of the discovery, see this issue of the *Astronomical Society of the Pacific's Astronomy Beat*: <http://bit.ly/tombaugh>.

Things at the William M. Thomas Planetarium at Bakersfield College, California continue as before with the addition of showing *Mesmerica* on the first Fridays + Saturdays of the month. The advertising for *Mesmerica* is done very well because the planetarium is having sold-out shows with many people who have not come to the planetarium before, even though the tickets for *Mesmerica* are three times the cost of the regular public evening shows. All of the school field trip slots have been filled this academic year and the planetarium continues having a number of people show up for twice-monthly evening public shows. Nick Strobel continues writing twice-per-month astronomy column for the local newspaper and teaching college astronomy classes in the planetarium. The astronomy columns are archived on the Planetarium's website at <https://www.bakersfieldcollege.edu/community/planetarium/>.

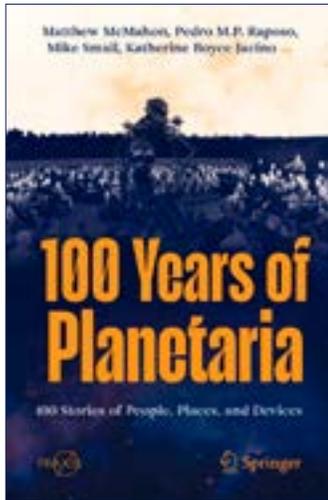
In December 2024, PPA started having quarterly meetings of members. The purpose is to encourage networking among



PPA. Screen capture from the second PPA Quarterly Meeting (March 25). Courtesy of PPA.

members apart from the annual conferences and google group messages. Since not all members can be there live at any given meeting time, the meetings are recorded and the recordings linked from a new Quarterly Meetings page on the PPA website (<https://www.ppadomes.org/business/quarterly-meetings>).

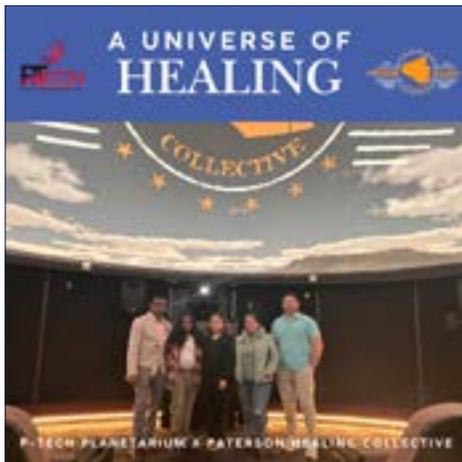
MIDDLE ATLANTIC PLANETARIUM SOCIETY



MAPS. Noreen Grice appearing in two books.

Noreen Grice, president of MAPS and educator at Western Connecticut State University and Planetarium, is in two books. She is featured in the new book entitled, *100 Years of Planetaria: 100 Stories of People, Places and Devices*. Her story is called *The Foundation of Accessible Astronomy in the Planetarium*, where she describes her work in making astronomy and the planetarium more accessible to people who are blind or visually-impaired. This book was produced in celebration of the centennial of the planetarium field and is published by Springer. Noreen is also in the *Texas Science* 4th grade text, from McGraw Hill, that includes two pages about her work to make astronomy more accessible to blind and visually-impaired learners!

The P-Tech Planetarium in Paterson, New Jersey is partnering with the Paterson Healing Collective (PCH), a community-based organization focused on providing support to individuals affected by and



MAPS. Carlos Miranda, P-Tech Planetarium Manager (far right) with members of the Paterson Healing Collective. Courtesy of P-Tech Planetarium.

survivors of violence and trauma. By offering calming visual experiences, moments of guided reflection, and a welcoming environment, the P-Tech Planetarium provides a safe space for participants to step away from daily challenges and explore new ways to foster healing. This initiative underscores the importance of planetariums as community resources that can support emotional well-being in addition to scientific discovery. The P-Tech Planetarium team hopes

this collaboration will inspire other planetariums around the world to explore how their spaces can serve as safe havens for those dealing with trauma, showing that the impact of planetariums reaches far beyond the stars.

Thomas Hamilton had another short story published, this time in *Bewildering Stories* published my story *The First Werewolf of Saturn*. Family discovers 11-year-old son has the family curse. Mom teaches him how to make the special sauce that prevents changes at Full Moon. He becomes a leading plant virologist

on Mars, is chosen for first manned expedition to Saturn, where critters on Titan start killing the explorers.

EUROPEAN/MEDITERRANEAN PLANETARIUM ASSOCIATION

In February, the Rijeka Astronomy Centre in Croatia organized a week program for the winter school holidays, focusing on life and research aboard the International Space Station. On 14 February, RAC's planetarium celebrated Saint Valentine's Day with a live show dedicated to the night sky, highlighting the beautiful love stories written in the stars and constellations. Also in February, RAC screened for the second consecutive year the movie *Agent 010*, in which all main



EMPA. Disability inclusion: RAC with the Spirit Association. Courtesy of Rijeka Sport Ltd.

actors are persons with disabilities that require wheelchairs. The film is produced by the “Spirit” Association to promote disability inclusion.

To mark the spring equinox, RAC and the Rijeka Academic Astronomical Society jointly organized a Welcome Spring! evening program featuring live planetarium show Night Sky Orientation, fulldome show Incredible Universe, produced by Brno Observatory and Planetarium, and a public lecture Asteroids: The Cause of the Apocalypse or the Seed of Life? The evening concluded with night sky observation through telescopes.

On 21 March, honouring the International Forest Day, the RAC organized its traditional park and forest cleanup around the planetarium. This activity involved students from Gornja Vežica Elementary School, the City of Rijeka’s cleaning and maintenance services, and the Rijeka Fire Department. For the younger children attending the event, RAC offered a free planetarium show and organised a “Land Art” workshop. For the next day, RAC honoured the Earth Hour by switching off all lights for one hour and screening the planetarium show Dark Side of Light, on the importance of natural darkness. On March 29, RAC celebrated the partial solar eclipse with live planetarium program Our Star: The Sun. Unfortunately, the guided rooftop observation was cancelled due to bad weather.

In April, the Rijeka Astronomical Centre launched different shows celebrating Yuri’s Night and the International Day of Human Space Flight, Earth Day and Dark Sky Week. At the time of writing, RAC is preparing various activities for the Science Festival (5-10 May), including a new planetarium show Star Networks, on all the major constellations visible from the northern hemisphere. RAC will also celebrate International Planetarium Day, with free morning planetarium screenings for kindergarten, elementary, and high school students, as well as free evening screenings and night sky telescope observations for the general public.

For the International Day of Light on 16 May, RAC is collaborating with the Science Outreach Centre of the University of Rijeka, Vežica Elementary School, and the Rijeka Academic Astronomical Society to prepare a program, highlighting the importance of light in science, art and culture. The program will include free planetarium screenings, a public laser night sky show, and a light installation by Berlin-based artist Franz John.

SOCIETY OF GERMAN SPEAKING PLANETARIA

In the anniversary year of planetariums, the new planetarium in the city of Halle (Saale) hosted the annual conference of German-speaking planetariums. From 5-7 April, more than 170 planetarians (a record!) met at the planetarium and the neighboring Central German Multimedia Center. The conference was opened by the Lord Mayor of Halle (Saale), Dr. Alexander Vogt. GDP President Dr. Björn Voss and Planetarium Director Dirk Schlesier also welcomed the numerous guests. The program ranged from specialist lectures and sponsor presentations to astronomical observations with Halle’s amateur astronomers and the

planetarium observatory’s remote telescope. Thanks to the support of the neighboring small planetariums Kanena and Merseburg, the Merseburg University of Applied Sciences and the State Museum with the famous Nebra Sky Disk, an exciting pre- and post-conference program could also be offered. Director Dirk Schlesier is delighted with the success of the conference: “The large conference was a great challenge for our small team. But the efforts were worth it: we had great people as guests, the atmosphere was sensational and the feedback from all conference participants was incredibly good!”



GDP. Participants at the annual meeting in Halle (Saale). Courtesy of Stadt Halle (Saale), Thomas Ziegler.

The Berlin State Monument Authority has listed the Zeiss-Großplanetarium in Berlin Prenzlauer Berg as a historic monument. On the occasion of Berlin’s 750th anniversary, the Zeiss-Großplanetarium was ceremonially opened on 9 October 1987 as one of the last representative buildings of the GDR. The building was planned and realised between 1985 and 1987 according to the plans of architect Erhardt Gißke by an interdisciplinary group of architects and experts and under the direction of the GDR Capital Berlin Construction Directorate (»Baudirektion Hauptstadt Berlin). With its 23-metre dome and 307 seats, the Zeiss-Großplanetarium is still the largest planetarium in Germany today, is considered Europe’s most modern science theatre and has welcomed more than 5 million guests since its opening. After 2022 and 2023, 2024 was the third record year in a row with 357,060 visitors.



GDP. Outer view of the Zeiss-Großplanetarium, now listed as a historic monument. Courtesy of Natalie Toczek.

The Zeiss-Großplanetarium was created with an ambitious vision: it was to vividly convey the latest findings in astronomy, present the progress of socialist space travel and showcase the GDR as a centre of high-tech. At the same time, it was to publicise the achievements of Carl Zeiss Jena GmbH internationally. After successful early years, the Zeiss-Großplanetarium faced a challenging transformation after the fall of the Berlin Wall and reunification. In 2016, it was reopened under the direction of Tim Florian Horn after two years of extensive modernisation and, together with the Archenhold Observatory, the Planetarium am Insulaner and the Wilhelm Foerster Observatory, was transferred to the newly established Stiftung Planetarium Berlin (Planetarium Berlin Foundation). This also saw a change in content from a classic star theatre to a modern science theatre: with over 5,000 events a year, visitors are offered an immersive experience including a lifelike starry sky thanks to the projection planetarium and 360° full-dome technology – the programme ranges from scientific planetarium programmes to live concerts, readings, radio plays, lectures and music events to film screenings in the in-house cinema.

In 2024, the Stiftung Planetarium Berlin reached a total of 406,890 visitors. With 357,060 visitors, the Zeiss-Großplanetarium, one of the four foundation facilities, recorded a good 6,000 more guests than in the previous record year of 2023 (351,024), making it once again the most visited planetarium in the German-speaking world. At the Archenhold Observatory, the number of guests increased to 37,816 (2023: 36,368) despite being closed for a good four weeks due to modernisation work. The Planetarium am Insulaner has been closed since summer 2023 and is being converted into a modern education centre,

while the neighbouring Wilhelm Foerster Observatory reached 2,416 visitors in 2024. With the INTENSE mobile science theatre, the foundation team was able to inspire 7,318 nursery, primary and secondary school pupils across Berlin about the cosmos. With other events such as the IPS conference the foundation was also able to reach 2,280 visitors.

Since 6 March, the Stiftung Planetarium Berlin has been presenting *The Great Solar System Adventure*, an award-winning full-dome production by NSC Creative: charismatic entertainer Schiaparelli takes visitors in his wondrous observatory from the glowing hot surface of Mercury to the icy vastness of Pluto. While the audience experiences the wonders and dangers of the Solar System up close, they also learn how precious our home planet Earth really is. The brilliant 360° programme won awards at the Brno Full-dome Film Festival 2024 and the Full-dome Festival UK 2024 and is complemented by a live section by the Stiftung Planetarium Berlin. “With the inclusion of the new programme in our standard repertoire, we are expanding our offer for children aged eight and over and continuing to pursue our primary goal: imparting knowledge at eye level with a large pinch of adventure and humour. Astronomy takes us on the most exciting cosmic journey through space and time”, says Tim Florian Horn,



GDP. Premier of the Die Grosse Abenteuerreise Durchs Sonnensystem in Berlin. Courtesy of Pedro Becerra.

president of the Planetarium Berlin Foundation. *The Great Solar System Adventure* can be experienced in German and English on numerous dates.

The Stiftung Planetarium Berlin hosted a variety of live events and highlights at its three locations during the partial

solar eclipse this spring. On 29 March, the rare natural spectacle of a partial solar eclipse could be marvelled at in Berlin and those interested could watch live as the moon moved in front of the illuminated solar disc. The celestial event began at 11:32 a.m. when the edge of the moon and sun touched and reached its peak at 12:20 p.m. with a maximum coverage of 15.3% in the German capital. At 13:08 the celestial event was over again. The Planetarium Berlin Foundation offered a special theme day for the partial solar eclipse on 29 March from 9 a.m. with a programme for the whole family. I

In the Archenhold Observatory, the Wilhelm Foerster Observatory and the Zeiss-Großplanetarium, visitors could look forward to guided live observations of the partial solar eclipse using professional observation equipment. Numerous experts guided visitors through the event live and shared exciting information on the processes of a solar eclipse. The event could also be followed in advance from 9 a.m. with thematically appropriate short fulldome programmes in the Zeiss-Großplanetarium and the Zeiss-Kleinplanetarium of the Archenhold Observatory, followed by moderated live streams on site with interesting facts about the formation of the special celestial phenomenon. After observing the Sun, the Space Day programme at the Zeiss-Großplanetarium was dedicated to the future and research in space: the fulldome programme *The Apollo Story – Capcom Go!* took visitors on a 360° journey through the history of the moon landing in 1969 and provided insights into current and future missions. In cooperation with the German Aerospace Industries Association (BDLI), *The Wonderful World of Space Travel* presented future-oriented projects and pioneering technologies in the space industry. Science fiction researcher Dr. Isabella Hermann provided a humorous examination of the connection between science fiction and the Universe in *Science Fiction and the Universe*. The Space Day programme kicked off on 27 March with the highlight event *Back to the Moon: SPIEGEL* journalist Christoph Seidler and ESA astronaut Matthias Maurer presented Seidler's new book *Armstrong's Heirs* and talked about the current race to the Moon.

GDP. Observation of the partial solar eclipse at Wilhelm Foerster Observatory. Courtesy of Steffen Junghanß.



ITALIAN ASSOCIATION OF PLANETARIA

In 2025 Two Weeks in Italy celebrates its 30th anniversary, in the same year of the Planetarium Centennial. The 2025 itinerant program of the American teacher, who is winner of the yearly initiative, includes six stops where the protagonist, Derek Demeter, director of the Emil Buehler Planetarium (Sanford, Florida) and secretary of the IPS, proposed lessons, workshops and presentations. The members of Italian Association of Planetariums (PLANit) and the astronomical facilities of the following locations have benefited: Perugia, Assisi, Florence, Ravenna, Lumezzane (Brescia) and Gorizia. The initiative was born in Lumezzane, where it continued for many years. Then it involved astronomical organizations of Perugia and Gorizia and, after the pandemia, more Italian cities. In the last years there has also been organized weeks in USA and in Germany thanks to the support of the International Planetarium Society.

The first stop, the city of Perugia, was an important destination during which Simonetta Ercoli helped the American teacher to familiarize himself with the Italian students and to test the lessons, for example *The Human HR Diagram*, with school time. A workshop for teachers was also held in Perugia. The highlight of Perugia was the celebration of the 30th anniversary of the Two Weeks in Italy (1995-2025), divided into three parts: a “photographic amarcord”, a screening dedicated to the Webb Space Telescope and observations of the night sky. After school lessons in Assisi, the winner had the privilege to visit the National Central Library of Florence to see and touch Galileo's manuscripts. In the Tuscan city a meeting with planetarians took place, as well as an evening at the Chianti Observatory, where a seminar on the Einstein Telescope was held, led by one of the mission managers, Michele Punturo. Later, at the Ravenna Planetarium, Derek Demeter was the guest of honor for *Sunny Sunday*, through an afternoon discovering the Sun and the Moon with the students of the A. Oriani secondary school. The two days in Ravenna ended with a guided tour of the city that includes aspect of astronomical interest.

The day in Lumezzane (Brescia) began with greetings from the representative of culture, Lucio Facchinetti, of the local municipality who welcomed the American planetarian at the civic library, where the students of the Moretti Institute followed the lesson *The Hammer and Feather Experiment* and the presentation about Webb Space Telescope. Derek Demeter visited the planetarium of Lumezzane where he shot some photos to show the point-like star depiction of the projector model built by the master optician Romano Zen, from Venice, in the second half of the 1980s. The day ended with the colours of the sunset that became the background of Serafino Zani Observatory visit. This institution is located in a public park in the mountains of Lumezzane.

Derek's long tour ended in the province of Gorizia, where classes followed the American teacher lessons at the Planetarium and Observatory of the Farra d'Isonzo managed by Astronomical Cultural Circle (CCAF). The program in Gorizia included two visits, to the San Canziano Caves in Slovenia and to the famous archaeological area of Aquileia



IAP. Visit to the National Central Library of Florence by Derek Demeter to see Galileo's manuscripts. Courtesy of Ruggero Stanga; The lesson The Human HR Diagram with students of Perugia and Assisi. Courtesy of Simonetta Ercoli; Official meeting between Derek Demeter and the representative of culture, Lucio Facchinetti, of the Lumezzane Municipality (Brescia). Courtesy of Luigi Cocca; Group photo with students, Derek Demeter and the staff of Circolo Culturale Astronomico di Farra d'Isonzo (Gorizia). Courtesy of Enrico Pettarin.

Guidelines for making planetariums accessible to deaf and blind people by Federico Di Giacomo. Among the new contents of the archive of free fulldome material, the video The Value of Planetariums by Lionel Ruiz and Dario Tiveron has been added. Furthermore, a new page is available on the PLANit website that collects new example tutorials on Blender and a clip has been uploaded that shows the composition of some atoms relevant in the astrophysical field created by Michelangelo Rocchetti, a member of PLANit and planetarian at the Museo del Bali. The idea of an animation of this type had emerged in Planechiacchiere, the WhatsApp group reserved for members.

On the occasion of the closing celebrations of the Centenary of the Planetariums, PLANit has decided to acquire the license of the film

and the Patriarchal Basilica, which are part of the World Heritage List. The CCAF planetarium was redeveloped with extraordinary maintenance work on the 8.5-meter diameter internal dome and the installation of the new Barco F70 4K UHD digital projector by Lamba with 4K resolution, supplied by Digitalis Education Solutions Inc., thanks to the ZAFA 25 Project, funded by the European Union under the GO! Small Projects Fund that supports projects in the cross-border area between Italy and Slovenia. Actually, this year Nova Gorica-Gorizia is celebrating the European Capital of Culture, the first cross-border European Capital of Culture, and the CCAF is celebrating 50 years since its foundation.

The website of PLANit is increasingly rich. In recent months, the first guideline on inclusiveness was published:

100 Years of Eternity for all associated Italian planetariums. At the time of writing, PLANit has organized an event on 7 May at the planetarium of the Città della Scienza in Naples, in collaboration with the Città della Scienza itself and with the monthly magazine Focus, which includes, among others, Roberto Ragazzoni, president of INAF. On the day of the equinox the Italian planetariums were invited to hold workshops and other activities on the theme of the equinox and use them as a pretext to raise awareness on the theme of equity. More details can be found on the Facebook page Equal Day Italia. The coordinator is Sara Zarrinchang who has collected all the initiatives by inserting them in the INAF Week 2025 and in the international map of the Equal Day website.



TALES FROM DOME UNDER A MISCHIEVOUS MINI-BLACK HOLE

All manner of public buildings have stories associated with them, apocryphal or not. On the other hand, no matter how unusual some of these tales may be, if one has been an eyewitness, it does add a certain believability to them. Planetariums, as you could guess, are no exception to such accounts. I heard of—and personally encountered—some oddities at the first facility I ever worked at; Strasenburgh Planetarium, in Rochester, New York.

As recounted in a previous article in this column, I started working there as an usher in February 1972. The following August, I started my freshman year of college at a local campus. For some reason I have forgotten, we had the whole month of January 1973 off before we started again in February for the spring term. The question then became what was I going to do with myself for a whole month.

Having already made up my mind I was going to make a career in planetaria as a Planetarium Educator, the most logical, and fun, thing for me to do was spend my month working pro bono (i.e., “working professionally for free, and for the public good”) at Strasenburgh. Whereas they would gain from my free labor, I knew I could definitely benefit from whatever I learned through either direct observation or from hands-on experience.

While I didn’t have a car, my father, who worked as a Program Manager for Xerox Corporation on the other side of the city, could drop me off on his way to work in the morning and then swing by and pick me up again on the way home out to the Rochester suburbs.

Much of my time was spent downstairs in the planetarium basement, which is where the sound studio, artist’s studio, and tech shop were all located. It was like being a kid let loose in a candy store.

Working in the tech shop alongside the three technicians we then had at the time, Jerry, Carl, and Elmer, one began to hear about how things would disappear around the shop right off of their workbenches as they were doing something. If you’ve ever been around such a workbench, they’re not exactly the most organized spaces in the world. However, if someone is, for example, building a projector—as was required in the analogue special effects projector days, decades before fulldome videos replaced them—and they put a tool down, like a screwdriver, they shouldn’t lose it right in front of themselves. I was close at hand one time when it had just happened to Elmer.

And yet such things were going on. It got to the point where the phenomena was referred to as Strasenburgh had its own mini-black hole. One has to keep in mind that this was just as black holes, mini or otherwise, were the then big mystery objects drawing a lot of attention in the world of astronomical research. The 1960s had their quasars; in the 1970s it was black holes.

But, unlike a real black hole, the one in the planetarium building at 663 East Avenue eventually brought whatever was missing back. It could be a couple of days, a week or two, but the missing object would reappear on the technician’s desk as if it had been there the whole time.

I experienced something similar myself, though it was in the autumn of 1975 when I was doing my student teaching at Strasenburgh. The only way I could get an undergraduate teaching degree in planetarium education was to do it as an Earth Science teaching candidate, and all education majors, regardless of their subject area, were required by the State of New York to have a whole semester of student teaching off campus.

After finally convincing my Education Department advisor I had absolutely no plans to teach in a conventional public-school classroom, but in a planetarium, he finally relented and agreed to my doing so under a starlit dome. When it came to the question of where that might take place, I parlayed my history at Strasenburgh—I was still working there in the summers—as the site for my student teaching.

It goes without saying that then Director Don Hall also liked having an extra person on staff who didn’t have to get paid, but in a good way. All of the time I spent working there over the years in my different capacities were solid gold, and remain strongly treasured memories to this day. By an odd coincidence, my Swedish wife, Mariana Back, took one of their production courses during the same summer as the 1988 IPS meeting held in Richmond, Virginia.

Being a student teacher, I had to have some place where I could work from, so I got permission to use what was supposed to be the original Director’s office. This was located up on a sort of half-floor overlooking the main office corridor of the planetarium.

Going up a wide winding set of carpeted stairs instead of following them down to the basement brought you to a large open room, with a balcony overlooking the office area, and the back door into the planetarium control room. Passing through there then led into the control console in the theater itself.

This open room was where the Director’s secretary, Nancy, was supposed to sit. On the opposite side was a wooden door leading into what was originally planned to be the Director’s office. To the best of my knowledge, the first Director, Ian McLennan, nor the second, former Educator Don Hall, had ever used it, so it just stood empty. If you were ever up in this office yourself, you would understand why.

It had an odd shape to it, the floor was carpeted, and the walls were perfectly smooth, painted all the same buff-brown color. But none of these are the bad part. There wasn’t a single window in the place, not that the ones in the regular offices on the main floor below were anything great. Rather than



being normal-width, they were tall and narrow, looking more like slits.

Not only was this office spartan, but so were the furnishings I managed to drag up to it via the spiral staircase. I found a long Formica-topped table with fold-out legs to use as a drawer-less desk, plus a bright orange molded plastic bucket seat with a Velcro-attached cushion, sitting on nickel-plated legs. Those, plus a beige rectangular plastic garbage can were all I had, though I didn't need much more.

The orange chair was the most colorful thing in the room. Again, the walls were beige, the commercial office carpet on the floor was medium-beige, and the Formica table top was off-white. I think you get the idea; dull, dull, dull.

Since the table had no drawers, I was using plastic shopping bags leaned against the wall directly behind me for a horizontal "filing cabinet."

At one point I taped some heavy black pieces of cardboard, the same size as 35mm slides, on the blank wall across the room directly in front of me in the shape of a polar-view spiral galaxy. To liven up the place. If you're unfamiliar with these relics of analogue planetarium's past, they were inserted into Kodak Carousel 35mm slide trays to act as a dark slide in order to divide, for example, different groups of slides. It was also a thing to put one in the "00" slot so you would know when the tray had reset to its start again.

One afternoon I was up in my office writing some notes with a conventional lead pencil on a yellow legal pad of paper. Known in the States as a #2 pencil, this one was the typical "school bus" yellow-orange, with a pink eraser tip at its top. These are famously used to fill in the little empty ovals on machine-readable tests, and other such forms. Outside of the pad, the tabletop was clear of clutter.

This circa 1968 postcard view of Strasenburgh Planetarium, taken by Head Technician John Paris with a 4" x 5" sheet film camera and used in a set of souvenir postcards, shows the entrance area of the building. The car seen at the right edge is artist Vic Costanzo's Chevy Camaro. The winding staircase used to go down to the basement studios and workshop, and up to the unused Director's office is in the gray "tower" seen directly behind the single left lamppost. The dark line along its right edge is actually where there was a gap in the concrete wall where there was an alcove to a staff entrance. The office I was using as a student teacher was located in the area behind the left end of the rising curved wall along the roofline seen to be coming from the right (i.e., where the tree branches dip down and appear to touch the roof). Note the aforementioned vertical "slit" windows along the wall in front of Vic's car. How does one know this is early in the Rochester planetarium's history? Because the very large bronze statue (5.18 meters/17 feet high), which resembled a highly-stylized rocket taking off, hadn't been installed yet. Designed by Milanese Italian sculptor Francesco Somaini (1926 - 2005), it was dedicated on Strasenburgh's second anniversary on 14 September 1970. Today the sculpture is considered to be a Rochester landmark. Source: author's collection.

Putting the pencil down, I accidentally knocked it forwards off the table onto the floor. Thinking nothing of it, I bent down to retrieve it. Normally only taking a few seconds to do so, the yellow-orange pencil was nowhere to be seen on the medium-beige carpet. Getting up from my chair, I walked around the desk, scanning the floor for it. Again, nowhere to be seen, nor was it in the beige garbage can alongside the table even after dumping all the crumpled papers out of it.

After making a thorough search of the room from every-which-way, I gave up the hunt, went downstairs, got another #2 pencil, and continued making my notes on the pad. And no, there had not been anyone visiting me during that day

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MOBILE NEWS NETWORK OUTREACH WITH A MOBILE DOME



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Planetariums can offer diverse content, both educational and entertaining, and all offerings can be inspiring and memorable if we do our jobs well. We can provide this content in many ways, including live interactive experiences, fulldome films and domecasts, 3D models and simulations, real-time data from scientists, virtual reality experiences, or even in some combination of all of these approaches.

Whatever we do, we need to be aware of the impact we make by being grounded in the latest research about how people learn. No matter what or how we present, people are learning. Our goal should be to avoid having them learn misconceptions. Our presentations are very powerful and any misconception will be deeply embedded in the minds of our audiences.

Learning is satisfying and can be entertaining, but only if we know how people are receiving our presentations. Knowing how to teach can inform all of our efforts and keeping a pulse on audience reactions can tell us if we are doing our job well. If you provide live interactive programming then you can gauge the impact of the program through that interaction, otherwise we must devise methods for surveying the audience in efficient ways; for example: incorporating surveys into your shows, using online platforms, or offering incentive-based surveys.

The first step in developing a survey is to define your goals: What information do you want to learn about your audience? Are you looking for general demographic data, or specific interests in certain astronomy topics? Do you want to improve show content, better tailor educational outreach, or attract new visitors?

POSSIBLE SURVEY METHODS

- **Post-Show Surveys:** Distribute paper or digital surveys after shows, allowing audience members to share their thoughts and experiences immediately after the show.
- **Online Surveys:** Utilize online platforms like Google Forms or SurveyMonkey to reach a wider audience and collect responses efficiently. If you have an online ticket system it can send an email after the show with survey questions or for some events you can have signs, with a QR code, placed around the building.
- **In-Person Surveys:** Conduct brief surveys with visitors at the ticket counter or during other accessible moments.

DESIGN YOUR SURVEY

Use clear and concise language and avoid technical jargon. Tailor your survey questions to address your specific research goals. For example, you might ask about their prior knowledge of astronomy, their expectations for the show, or their level of satisfaction with the experience. Include a variety of question types, such as multiple-choice, rating scales, and open-ended questions to gather both quantitative

and qualitative data. Offering small incentives like a discount on future tickets or a free pass can encourage participation.

ANALYZE AND UTILIZE YOUR DATA

Analyze your survey responses to identify trends and patterns in audience preferences and expectations. Use the insights gained from your surveys to inform your show selection, content development, and marketing strategies.

Regularly revisit your surveys, refining your questions and methods to continuously improve your understanding of your audience and the effectiveness of your surveys.

SOME HELPFUL RESOURCES:

- **Expanding your universe: How to grow an audience for your planetarium** by Mike Murray; March 2016 Planetarian <https://cdn.jmaws.com/www.ips-planetarium.org/resource/resmgr/pdf-articles/article-mikemurray032016.pdf>
- **A Survey on Audience Interests and Expectations for Planetarium** by Alyssa Zajan and Erik; September 2021 Planetarian <https://soar.suny.edu/handle/20.500.12648/8619>
- **A Guide to Conducting Educational Research in the Planetarium** by Julia D. Plummer, Shannon Schmol, Ka Chun Yu, and Chrysta Ghent; June 2015 Planetarian <https://www.ips-planetarium.org/page/ConductingResearch>

PLANETARIUM ON THE GO:

In 2016 Christos Sakkas created Planetarium On The Go and continues to manage it as a thriving business today. He has degrees in Civil Engineering from the University of Patras and MSC Engineering Project Management from University of Manchester Institute of Science and Technology, and since 1999 he has worked in civil engineering constructions.

His 6m mobile planetarium has a semi-permanent fixed dome with chairs for 36 audience members. The dome can be set up indoors or outdoors, day or night-rain or shine. It is air conditioned with heating during the winter and cooling during the summer. A typical event can consist of planetarium shows along with telescope observations and meteorites which you can hold in your hand. Two telescopes are utilized: a Smith-Casegrain 8" (20cm) for observing Planets, the Moon and bright stars and an eVscope for observing deep sky objects, star clusters, nebulae, and other distant galaxies (even from urban environments) Images from the eVscope can be saved directly to a mobile phone. With special filters the sun's photosphere and sunspots can be observed sunspots during the day.

But this is not the only kind of presentation that the company brings to audiences. Mr. Sakkas explains below another popular program which is part of the company's offerings.

EXPLORING THE BRAIN: A UNIQUE SUPPLEMENTARY EDUCATIONAL EXPERIENCE BY CHRISTOS SAKKAS

“Exploring the Brain” is a dynamic, interactive educational program that introduces students to the fascinating world of neuroscience through engaging visual, scientific, and hands-on activities. Designed by the Department of Physiology of the University of Ioannina Medical School in collaboration with Planetarium on the Go, this initiative brings high-quality science outreach directly into schools, enriching the existing curriculum in a fun and meaningful way.

At the heart of the program is Planetarium On The Go, the only mobile planetarium in Greece equipped with a stable dome (vacuum dome), 36 fixed seats, and a 6-meter-wide hemispheric projection screen. Its powerful visuals and immersive setup provide a unique setting for the supplementary learning experience, transforming classrooms into exploration hubs for the human brain. The program is suitable for all educational levels and is designed to adapt to the developmental needs of each age group. The main attraction includes high-definition dome screenings of brain-focused documentaries. These films highlight the evolution of brain science from antiquity to the present day and encourage critical thinking about human biology and cognition. Complementing the visual experience are live presentations and Q&A sessions with scientists, offering students the chance to interact with experts in the field of neuroscience. Students are encouraged to ask questions, explore concepts, and reflect on the mysteries of the mind. A highlight of the program is the hands-on microscope activity, where students observe real brain cells, connecting classroom knowledge to real-world science.

This initiative is not just educational, it is inspiring. It encourages curiosity, fosters scientific

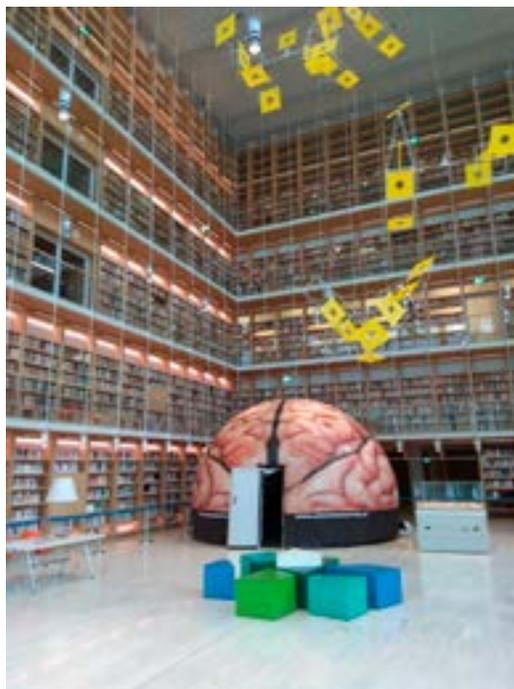
thinking, and provides a rare opportunity to experience science through multiple senses. All activities are evidence-based, carefully curated to match the school curriculum, and suitable for inclusive learning environments, including students with special needs or mobility challenges. This is a powerful opportunity to integrate cutting-edge science into the everyday learning environment—bridging imagination, education, and discovery.

(I discovered this program on Facebook with the following posting and accompanying photos. I believe this program is a really good example of a planetarium working with scientists in their local community to create a valuable experience.)

“EXPLORING THE BRAIN” IOANNINA 22-23 MARCH 2025

The “Exploring the Brain” event, held in Ioannina on March 22-23, 2025, was a collaborative effort between the

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(Clockwise from top left) In this picture, you'll notice a distinctive brain-shaped cover on the planetarium. Unfortunately, it was damaged during the COVID period due to humidity and four years of non-use; Students inside the dome for a film and live discussion; Medical school students guided attendees in observing real brain cells under microscopes; Student studying a model of the brain; Students participate in a hands-on microscope activity, where they observe real brain cells. All Pictures provided by Christos Sakkas:

LIP SERVICE



For those of you expecting an article penned by Karrie

Berglund, she asked me to be a guest author this month.

Karrie and I, along with our fellow Live Interactive Planetarium Symposium (LIPS) board members have been discussing ways to better connect those of us committed to interaction with our planetarium audiences. We want to grow this wonderful community. We look forward to sharing resources and the practices of our talented colleagues.

One amazing resource and colleague is Alan Gould, who spent a rich career at the Lawrence Hall of Science (LHS), a museum affiliated with the University of California, Berkeley. The planetarium at LHS did groundbreaking work in developing interactive programming thanks to another Alan. That would be Alan Friedman, the facility's original planetarium director, and Alan Gould's first boss. Heavily influenced by Friedman both personally and professionally, Alan Gould has carried that legacy forward, and continues doing so to this day within IPS and the Pacific Planetarium Association (PPA), as well as at LHS, even though he retired from there in 2013.

I spent an afternoon in March with Alan Gould to record a wide-ranging interview, giving him a chance to reflect on over 50 years worth of experience and demonstrate activities used with the type of programming that inspired LIPS. I found Alan on that spring day as I've always found him. He had that slightly mischievous glimmer in his eye while also being relaxed, curious, thoughtful, and present. In fact he often stated many of his recollections, even back to the 1970s, in the present tense, reflecting his ongoing dedication to planetarium education.

With nearly an hour of recordings, I can only share highlights here. More content, sprinkled with Alan's good-natured humor and wisdom, will be available as we build up the LIPS website (<https://lipsymposium.org/>). For now, I'll step aside and let the words of Alan (and others) do the talking. All of the following remarks have been edited for brevity and clarity.

—Andy Kreyche

ALAN GOULD IN HIS OWN WORDS: CONTINUING, CREATING, AND LEAVING A LEGACY

AUDIENCE PARTICIPATION: ORIGINS AND TERMINOLOGY

One of the first shows I learned at LHS was “Stonehenge,” a good example of a planetarium show where we involved the audience. We marked the alignments of the stones along the horizon, showed where you could see out of Stonehenge and asked, “Is there anything



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interesting astronomically there?” We would go through one evening, and people would hang markers on the horizon to indicate interesting things—bright stars, planets, whatever—that would be rising or setting. It's exciting when the audience gets actively involved.

In that show the main focus became where the Sun would rise and set. I remember one time after doing a show I went up to Alan Friedman's office and said, “You know, we really need a show that features the night sky more.” And he was listening. He wrote a show that became “Constellations Tonight.” To me, that's the quintessential audience participation program.

In most ordinary constellation shows, a presenter will point out constellations and tell stories. And with a good presenter it will be an interesting program. But it's in the style of a lecture. Alan Friedman created that show so people could learn how to find constellations themselves. We gave them star maps and reading lights, taught them how to use the maps, and then they pointed out constellations to each other. People really enjoyed that.

When I hear the word ‘interaction,’ I'm reminded that there's a sort of a technological interaction that planetarium people tend to refer to. But there's also personal human interaction. I choose to use the term audience ‘participation’ rather than ‘interaction.’ You can call it audience interaction, but it's not interactive in the button pressing sense that I think of the word. Whatever you call it, audience participation can be more effective in getting a concept across. People tend to remember what they did more clearly than just hearing a concept explained.

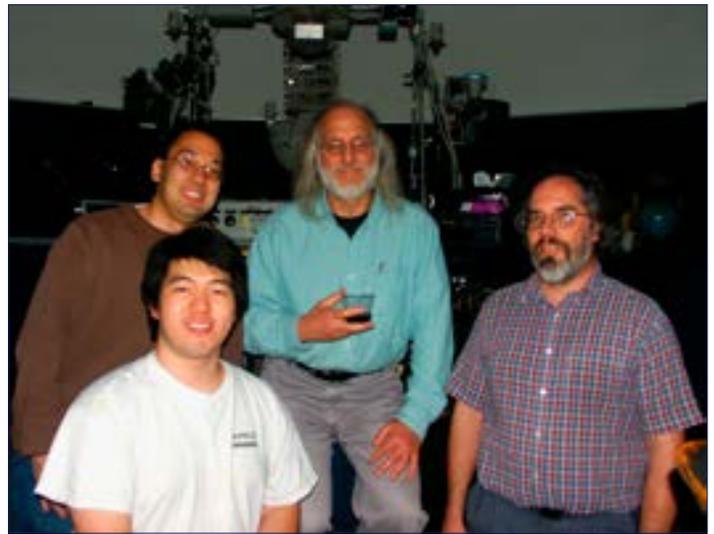
TEACHING STRATEGIES WITH QUESTIONS AND ANSWERS

LHS held workshops for planetarians led by teachers in the Education Department at UC Berkeley. Some of the most important topics were: how to ask questions, what kinds of questions to ask, and how to respond to questions. We learned that it's as important to ask the right question as it is to respond to somebody's answer. And we learned about the theory of wait time.

There was a study where researchers went into classrooms. They timed how long it took from after a teacher asked a question to when the teacher either restated the question, or just went onto another question, without an answer having been given. Most teachers were waiting only 1.3 seconds. The researchers found that by consciously waiting for 3 seconds, both the number

and quality of responses increased tremendously. The simple act of being patient and slowing down improves your presentation. That quiet, reflective time gives people a chance to think, “Oh, what's a good answer to that question?”

Asking questions is a whole art. If a student gives an answer to a question and you don't really accept their answer, any



(From top) Mary Holt, current Lawrence Hall of Science (LHS) Planetarium Manager, with Alan Gould in March 2025, at the belated presentation of Alan's 2024 IPS Service Award. An untimely bout of Covid prevented Alan from receiving it at the IPS conference in Berlin. *Photo by Andy Kreyche*; A model rocketry class at the Lawrence Hall of Science in the 1980s. Cary Sneider, developer of the class, is second from left and Alan Gould is standing behind the person preparing a rocket for launch. *Photo provided by Alan Gould*; Inside the Holt Planetarium in 2001, GOTO Mercury projector in the background. Students used star clocks to tell time from positions of the Big Dipper, Polaris, and Cassiopeia. *Photo provided by Alan Gould.*

(From top) 2008 staff photo taken inside the Holt Planetarium at the Lawrence Hall of Science. Left to right: Toshi Komatsu (back), Jeff Nee (front), Alan Gould, John Erickson. Alan was breaking the "no drinking in the planetarium" rule that day. *Photo provided by Alan Gould*; At a 2008 event honoring Alan J. Friedman, first director of the Holt Planetarium at the Lawrence Hall of Science. Left to right: Alan Friedman, Andrew Fraknoi (ASP Director), Dennis Schatz (Pacific Science Center), Budd Wentz (Sky Challenger creator), Cary Sneider (another Holt Planetarium Director), Alan Gould. *Photo provided by Alan Gould*; Left to right: Alan Gould, Cary Sneider (Planetarium Director before Alan Gould, on trumpet), Budd Wentz (creator of Sky Challengers, on kazoo). *Photo provided by Alan Gould*

good educator knows to somehow give a positive response, even if the answer is totally off the wall. But I also learned that off-the-wall answers can be illuminating. If

you take time to think about a person's answer, you can delve into their logic, which is worth pursuing. That helped me think more about what people say to me, not only critically, but in an accepting way. I try to understand them.

LIGHTBULB MOMENTS, 'MINDBLOWINGNESS,' AND HUMILITY

There are many, many topics where an audience lightbulb might go off, but one of my favorite ones has to do with the size and scale of things in the universe. It's intrinsically mind blowing to anybody who really tries to grasp it. And you don't need a planetarium. If you're just out looking at the night sky in a stargazing session you get these questions. What is a light year? How far away is that thing? What's the difference between, say, a solar system and a galaxy, or a galaxy and the universe? Lightbulbs go off when people start to grasp it. Those are some of my favorite moments of mindblowness.

We could call it a consciousness of scale. It's expands your consciousness without drugs. To stretch your mind by trying to grasp enormous scales of distance and time is really valuable. You can realize your place in the universe a little bit better. And you can gain a better sense of humility once that hits home. Sure, you can have an effect on things around you, but don't get carried away with how far your effect might reach. For some people it may get pretty far, but for most people, not so much. And to be satisfied with that is actually an important value. Don't be overly anxious to have your effect on the world be magnificent or overblown.

THE VALUE AND FUTURE OF AUDIENCE ENGAGEMENT

The most important thing about live presentations is the engagement factor. People who attend audience participation programs like them. In fact, there was an article published in *Planetarian* about our facility titled "Best Planetarium in the World" (Vol. 29, No. 1, March 2000). That's a little over the top, but the point was that people like audience participation programs. They get a lot out of them. At LHS we haven't done much in the way of before and after testing to validate this. That's very difficult to do, especially in informal education, but anecdotally, the feedback we get is positive.

I've been concerned with the future of live programming since 1974. In the 1980s we hosted summer institutes for planetarians from around the country. We got to delve into questioning strategies and planetarium programs. During that time we did surveys about audience participation in planetariums. There were maybe 20% of planetariums doing some sort of live portion during their programs. And then maybe 10 years later we checked again, and it was still 20%. [laughs] And I think it's probably still 20%.

The good news is that in the most recent survey we added the question, "With your recorded programs do you do a portion that's live or some aspect of live?" And we found

that 40% or more planetariums do that. They like to do the recorded shows because they're easiest to do. You press a button and walk away. But many of those planetariums have a live component.

The planetarium programs we developed at LHS are published on an IPS web page Planetarium Activities for Successful Shows, or PASS

(<https://www.ips-planetarium.org/page/pass>). There are whole programs online for free, but there's also a section where I broke them apart into individual activities. That way, people can take an activity and use it in the context of a larger program. I think that's more valuable now to the planetarium world.

LESSONS FROM A MENTOR

Alan Friedman led really great staff meetings. There's something I've remembered throughout my life that I attribute to him. It's a guideline for actors and other performers that says, "Don't try to fit everything in. Don't try to go into all the exquisite details. Leave them wanting more."

The idea was to avoid trying to fill audiences full of facts. It's better to leave them with an exciting, interesting, and fun experience. I always remembered that, and it applies to other areas of life too. And it took the pressure off when giving a program. If you got two thirds of the way or even halfway through the script and said, "Oh my God, I'm not gonna finish." It's a challenge to figure out how to make the transition to the end while keeping it fun and interesting. But it's definitely worth doing rather than cramming everything in and going overtime.

Alan Friedman was a gentleman's gentleman. He was such a nice person and a great boss. Sometimes a boss can be almost cruel to get you to do your very best. But Alan Friedman wasn't one of those.

TESTIMONIALS

TESTIMONIAL #1

I was nervous when I attended my first planetarium conference, not knowing anybody apart from Alan. But everywhere I went, everyone was so welcoming and said things like, "Oh, you work with Alan!" or "Oh, you're from the Lawrence Hall of Science with Alan—we love your work!"

That experience helped me realize what a giant in our field Alan is, and how much of an impression he's made promoting and pioneering interactive planetarium content. He has inspired so many people in so many domes to try—even if in just a small way—actually engaging with the audience, and not just lecturing to them. He embodies the idea of being the "guide on the side, rather than the sage on the stage."

Toshi Komatsu
Planetarium Director, De Anza College

(Continued on pg. 55)



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SEEKING WHAT WORKS QUESTION CARD STUDY

INTRODUCTION:

If you know anything about me, then you know I am keen on anything that will increase my ability to communicate with my audiences, and have them communicate with me. The most common type of this sort of interaction is asking questions. But how does one do this? The following method has some preliminary data to demonstrate that it seems to work.

Historically, many methods have been tried to increase student engagement, interaction, and participation in the planetarium environment. Examples include the use of “audience response clickers” built into the seats, or given to audience members upon arrival at the planetarium. What are some other techniques? Some of these strategies come directly from classroom teaching experience, but all of them seemed to be somewhat lacking in actual question output from students. This research grew out of my frustration with this lack of interaction I was experiencing with my students. These data are the result of that quest.

OBSTACLES REGARDING INCREASING UNIQUE STUDENT INTERACTION:

Several factors act as roadblocks to this interaction. One of the most important is Ridke’s *Mystique of the Planetarium*. Ridke (1974) asserted that in order for the audience to be more fully engaged, one must “remove the veil” of wonder at the strange environment a student suddenly finds themselves in. Giving students a quick overview of the cool stuff in the room is important so that they can then be more receptive to sharing and taking in information. Many students are reluctant to interact with an unfamiliar adult who is looking for the answers to questions posed, even by another student. There are many other factors also at play here, including economic/food insecurity, ethnicity, gender, and age of the students. For example, Clark (2003) reports that most Indigenous American female students don’t ask many questions, and oftentimes get lost in the mystique of their new environment (the planetarium), or get distracted by their peers. Since 35% of my students identify as indigenous, this presents what can be an overwhelming barrier.

DATA ACQUISITION:

In January and February of 2024, teachers were encouraged to have their students write down questions on 3x5 cards in the standard pre-visit letter I sent to schools three weeks ahead of their planned visit to the planetarium. These are then read by me out loud, without identifying the writer so that students can hear the question without the pressure of being the center of attention once I’ve introduced myself and the room. As students hear me taking time and energy to answer their questions they seem assured that they’re in a safe academic space, and they therefore ask more questions.

A comparison is then made between the number of questions asked by students during the program who didn’t prepare questions ahead of time, to the number of questions asked during the program by students who did prepare questions in advance. In order to minimize the effect of a handful of students asking multiple questions, after five questions have been asked out loud I state, “please ask a question only if you haven’t already asked one.” This helps ensure more complete participation by more individuals.

By having teachers request students write out a question ahead of time, the teacher may reflect on the experience, and perhaps answer some basic questions about why the class is going there in the first place. For the students, this should focus them on what to expect, and what they might learn about while at the planetarium. Also, if students talk to their caregivers about upcoming school events, the subject of visiting the planetarium will evoke generally positive memories based on the adults’ own childhood experiences inside the Robeson Planetarium, as most of them have come to the Robeson Planetarium when they were in public school in this community. Most of their teachers grew up here also.

HYPOTHESIS AND METHODOLOGY:

A higher number of unique individual students will ask questions in the “questions prepared” group, vs. those in the “questions unprepared” classes. Anonymous recordings enable me to keep a more accurate count. These recordings and data analysis by all relevant reviewers are deleted upon completion of the research project.

PRELIMINARY RESULTS AND DISCUSSION:

Table 1 is data that has been recorded and analyzed from a total of fourteen recorded lessons.

The graph in Figure 1 shows a dramatic increase, more than 500%, in the number of unique questioners. The number of unique questioners is positively linked to the anonymous reading of questions that they’ve prepared beforehand.

IMPLICATIONS FOR PLANETARIUM EDUCATORS:

If you are trying to increase the number of students who engage meaningfully with your program and its content, find a way to get students to ask you questions that they’ve thought about **before** their visit. Perhaps they email them to you, submit through an online form, or have them on an electronic device if the paper is impractical or objectionable. This study indicates this to be a dependable way to make your audiences more interactive and receptive to questions and answers.

Our regional demographic features a high percent of two minority groups, African and Indigenous Americans. Research in diversity shows that students in these

GROUP ID	QUESTIONS SUBMITTED?	UNIQUE QUESTIONERS	NOTES, ETC.
A	yes	21	n=25
B	Yes	10	n=25
C	yes	15	n=25
D	yes	19	n=28
E	yes	13	n=27
F	yes	12	n=34
G	yes	15	n=35
H	yes	13	n=14
u	no	3	n=24
v	no	2	n=39
w	no	3	n=18
x	no	2	n=25
y	no	3	n=28
z	no	4	n=32
	UNIQUE Q'ERS, MEAN		
Submit Q's	14.8		
Didn't submit Q's	2.9		

Table 1: Data and averages (mean) for the groups that submitted questions, and those that did not submit questions.

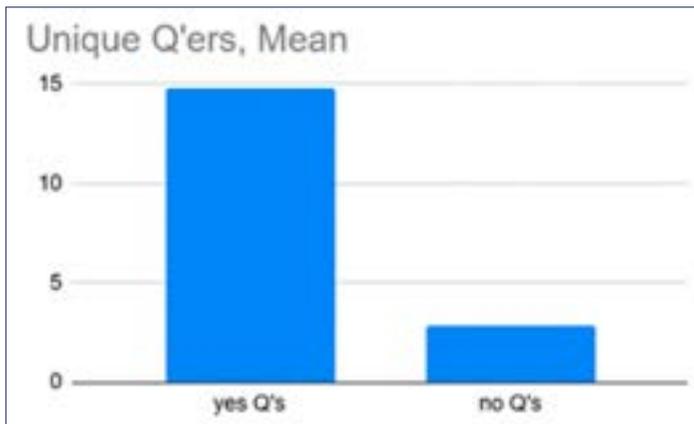


Figure 1: Graph of number of unique questioners, vs. whether or not the class submitted pre-written questions.

demographics are less likely to interact with a white male. This is even more prevalent among females within these subgroups. More research, focusing on the number of Native American females who interact with male white presenters, as well as from Native presenters needs to be carried out.

I'm also finding that more students in the "questions prepared" group will ask questions that can be classified as higher order questions that seek deeper answers, such as "What would happen if...", Analyze, Evaluate, and Create vs.

those in the "questions unprepared" classes. More research needs to be done in this area as well, but I've found a noticeable difference among my own students. This could be because the students who don't normally interact are coaxed into doing so, and I think that these students would tend to ask the higher order thinking skills-type questions.

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Raizes (con't.)

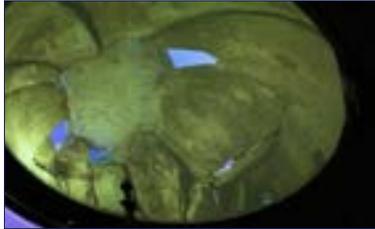
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A Week with GDP (con't.)

mostly wandered around the museum, taking note of a few objects that I could refer to in my presentation. Yes, I was assured that would have at least one, possibly two sessions, by the end of the day.

The first session was attended mostly by the Archenhold Sternwarte's staff, which proved to be an interested audience. I try to have my presentations as interactive as possible, so there are a few details that are sure to trigger questions... and those were asked. The questions kept coming after the presentation and I was happy to show some extra images, mostly of pre-historic monuments in Portugal, on my laptop.

The second session turned out to be a more private one, more of a conversation than a presentation, but I found it quite interesting nonetheless.



full plate, preparing the IPS conference that would happen the following week. Learning to operate and script a new planetarium system from scratch was an opportunity I wouldn't skip.

Creating an entirely new presentation was an added challenge. I wanted to bring something different and do a kind of show I don't normally do at my institution.

It was an amazing experience! I got to visit a beautiful city, meet wonderful people, explore two very distinct planetariums, learn how to work on a different planetarium software, show some Portuguese monuments and landscapes, taste the Berliner currywurst, talk about archaeoastronomy...

The Stiftung Planetarium Berlin team was awesome. They received me very well and made me feel like I was part of the team.

PART 5: AND WHAT ABOUT THE CHEESE?



This story begins some 8000 years ago in the Mondego valley. Come and visit me in Coimbra, Portugal, and I would love to tell you all about it.

PART 4: TIME FLIES...

...when you're having fun. The week was over too soon!

I love to learn new things and I have learned a lot. It would have been safer to just create a sequence of short full-dome clips on my own system or, as in the WwtGDP program FAQ, have the host operate the planetarium system during my presentation... but that would be just like giving a lecture and much less fun. Also, my hosts already had a

SPECIAL THANKS TO:

My family,

Tilo, Anna, Jürgen, Alma, Stefan,

The International Planetarium Society (IPS),

The Society of German-speaking Planetariums e.V. (GDP), Stiftung Planetarium Berlin,

UC Exploratório - Centro Ciência Viva da Universidade de Coimbra.

Mobile News Network (con't.)

Department of Physiology at the University of Ioannina and Planetarium On The Go, offering the public an opportunity to delve into fascinating aspects of the human brain. The event featured engaging presentations by University of Ioannina researchers, followed by an extensive Q&A session, allowing attendees to learn about the cutting-edge research happening at the local university and interact directly with leading scientists in the field. Topics covered included brain learning processes, the role of novelty in inspiration, AI and brain science, dementia, brain addictions, and stress in daily life. Planetarium On The Go fulfilled its role in science communication by playing a key part in organizing the event. The full-dome films "Neurodome" and "Mysteries of the Brain" provided a visual journey through brain functions, while medical school students guided attendees in observing real brain cells under microscopes.

Christos advertises, "Contact us to come to your place all over Greece and anywhere in the World if invited!" <https://www.astrotours.gr/>

Tales from Dome Under (con't.)

who could have sneakily "borrowed" it; certainly not while I was actively using it.

You'd think this should have been the end of the story, but it isn't. About two weeks later, I was up in my little "cell" working away, and it reappeared again. Whereas I only had one yellow-orange pencil when I started working that morning, I now had two sitting on the off-white Formica tabletop.

Not giving much thought about it before, this brought to mind the jokingly-referred-to mini-black hole, which used to plague the technicians downstairs in their workshop. Who knows; maybe this little "corps obscure" had decided to try having some fun in another part of the planetarium building.

Mentioning the incident to one of the techs after the second pencil showed up, his reaction was a knowing look, followed by, "The mysterious black hole strikes again." Indeed!

A WEEK WITH THE GDP 2024/25

The Society of German-speaking Planetariums e.V. (GDP) in association with the International Planetarium Society (IPS) is pleased to announce the name of the winner of its fourth “A Week with the GDP” professional development competition which is open to planetarians from around the world.

This year’s winner is Shawn Laatsch from the United States of America. Shawn Laatsch, director of the Versant Power Astronomy Center and Jordan Planetarium at the University of Maine will spend a week working with students, teachers, and the public as the guest of the Galileum Solingen. As a former president of the International Planetarium Society, he has been a guest lecturer in Argentina, Brazil, China, Greece, Italy, Japan, Mexico and New Zealand. Mr. Laatsch will spend a week with his host on dates to be determined in 2025, when he will teach lessons to students on a topic of his choice in astronomy and/or space science. He also will make public presentations to general audiences.

Dr. Frank Lungenstrass is Treasurer and Managing Director of the Galileum Solingen. The Galileum Solingen opened in 2019 and is apparently the world’s only planetarium housed in a freestanding spherical gas tank. The former gas tank, with a diameter of 26 m, now houses a planetarium with a 12 m dome and 84 unidirectionally arranged seats. Adjacent to the building is an eight-story building housing the entire infrastructure, including a small exhibition area and a seminar room. The planetarium features a Chronos-2-star projector from Goto and a 4K full-dome system Sky-Explorer from RSA Cosmos. The Galileum Solingen is operated largely on a voluntary basis and without public funding by a sponsoring association: the Walter Horn Society, founded in 1921. Email: lungenstrass@galileum-solingen.de, Website: <https://galileum-solingen.de>

IPS professional development opportunities, titled “A Week in the United States,” and “A Week with the Society of the German-Speaking Planetariums” are modeled after a long-running and successful program called “An Astronomical Experience in Italy for an American Planetarium Operator,” also supported by the IPS. The IPS hopes that these initiatives will serve as models for other countries to follow and, as the years pass, evolve into a broader cultural and professional development exchange for planetarians around the world.

The global association of planetarium professionals, IPS has nearly 700 members from 35 countries around the world. They represent schools, colleges and universities, museums, and public facilities of all sizes, including both fixed and portable planetariums.

The primary goal of the Society is to encourage the sharing of ideas among its members through conferences, publications, and networking. By sharing their insights and creative work, IPS members become better planetarians.

CONTACTS:

- For more about “A Week with the Society of the German-Speaking Planetariums” or the program logo contact Tilo Hohenschläger at mail@tilohohenschlaeger.com.
- To contact the winner: Shawn Laatsch, shawn.laatsch@maine.edu

Seeking What Works (con’t.)

TESTIMONIAL #2

When I started my career as a planetarian in the early 1990s, I was rather isolated. I hadn’t heard of IPS or my local affiliate, the PPA. I had, however, heard tales of this small planetarium at UC Berkeley that was doing really big, new things. Their approach was to have audience members participate in the show.

When I began attending planetarium conferences, I met Alan Gould, and learned much more about their methods. Alan and his team were sowing the seeds for a fresh approach to the sort of planetarium shows which later sprouted into LIPS and the whole interactive approach to planetarium presentations. I had always enjoyed connecting with audiences, but I learned the power of getting them really involved in the planetarium experience.

This approach not only helps school kids remember what they learned in a lesson, but audience members of any age feel that they are involved in a unique experience. No two shows are the same. With participatory shows, the idea of, „Oh, I went to a planetarium before, I’ve done that already,“ flies out the window.

Alan’s work at Lawrence Hall was the beginnings of a movement that sets planetariums apart from the relatively passive experience of a movie or lecture. I believe that the current growth and vitality of planetariums is a direct result of this approach.

Karl von Ahnen
Planetarium Director (retired), De Anza College

TESTIMONIAL #3

Words cannot encompass how Alan Gould has impacted the planetarium world, let alone „Uncle Al’s“ global impact on students and educators beyond the dome. So for a short testimonial, I’ll simply tell my story.

Alan took a Chemistry student and made him look up from the test tubes on the bench into a vast and fascinating universe. Toshi Komatsu hired me in 2005 as a student presenter at the Lawrence Hall of Science. He and Alan mentored me through the next decade, even after Alan’s official retirement. I also credit Alan’s recommendation for helping me get a job at NASA’s Jet Propulsion Laboratory, where I did my best to live up to, and spread, the ideals of planetarium education that Alan instilled in me.

Even now as I’ve transitioned to Sky-Skan, I hold those lessons at the core of every project I touch, as I extend my small corner of Alan’s monumental legacy. Alan, thank you—for everything. For being awesome in every sense of the word. For every student you’ve taught, directly or indirectly. For setting me on the amazing path that is my life.

Jeff Nee
Education Specialist, Sky-Skan International

A DIFFERENT POINT OF VIEW

A LITTLE BIT OF EVERYTHING



Ron Walker

The Star Barn Planetarium
P.O.Box 161
Cave Creek, Arizona, 85327

thestarbarn@gmail.com

By the time you read this, the 100th anniversary of the planetarium will be over and we will all go back to normal programming. But as I write this I'm not at all sure what I'm going to do. There is talk of everyone getting together on a zoom connection but I'm not at all sure that I have the computer chops to make that happen. I will probably just offer a show explaining how my Minolta projector works. One of the positive aspects of having a classic dumbbell shaped projector in the center of the room is that it always generates questions of how it works. I always give that show on my yearly anniversary which is June 13th. I'll offer it both dates and see how many come.

May is actually a special month as it was when Ray Worthy came from England for a visit with his family. He made a point to spend a day with me and see how far my dream of a planetarium had come. He was one of the most supportive persons I have ever met and would do everything to support someone else's dream. He even turned over a shovel full of soil in the place where I hoped to build my dome. That was something like fifteen years ago (was it really that long ago) and someone who helped and supported when I was ready to give up. I think of and miss him often.

Now I have a new visitor from England set to visit in May and if that happens I will write about it in the September column. Scott Tucker who has set up and built several domes in England has also created one of the best models of the Zeiss II projector. You can find the 3D printer files as well as pictures at <https://planetariumsasahobby.freeforums.net/thread/104/scotts-3d-zeiss-ii?page=1> and his dome work is somewhere there as well. <https://planetariumsasahobby.freeforums.net/>

I also plan on adding some more projectors that will project telescopic views of some deep sky objects in their proper location on the dome. Always looking for slides. I'm planning some evening shows that will start in the planetarium and then move to the observatory outside.

KEITH'S CAPTURED QUIPS ~ CHAPTER THIRTY-ONE

"I learned that if you are in one of the stars it would be very bright."

"My favorite part was when you showed us the giant's armpit star (Betelgeuse). It was so funny."

"Someday I will go to space and become famous. It will all be because of you because you got me to like outer space and planets."

(After showing them the guided tour video clip of the International Space Station) "I was wondering was the lady that's was showing us the space ship was it live or not?"

"Now I can tell my sister what some planets look like."

10 YEARS AGO (JUNE 2015):

As I look back this first ten years I am continually amazed by the realization that I was actually giving planetarium presentations at this time. As I review these articles I am continuously surprised as to how the various articles jive with my conclusions on various presentations. This was just reinforced once again by Jeanne Bishop's article "Seeing What Works" and in particular the video requirements area, point three to be exact. Literally an exact copy of what my first and longest running show is presented. At first I thought I must have copied it (so thank you Jeanne) but then, no, I had been giving this program for a year now. Perhaps I should chock it up to 'Great Minds Think Alike' but then my mind has never been that great. I had always thought my program was based on those shows I saw back in the 50's at the Adler when I was growing up. After all, my mind remembers things from back then much more clearly and precisely than things from a few years...months...days back. I remember driving myself to drink (not overly hard in my case) trying to remember what the the music the Adler used for sunrise at the end of a show. It came to me on my three AM trip to the bathroom, the melody at least, and based on that the composer, Wagner. YouTube found the work for me in no time, Act One Prelude to Parsifal. I've been using it ever since. Jeanne also gives 49 suggested topics for a video presentation which are also great suggestions for individual shows.

25 YEARS AGO (JUNE 1999):

While most of us were worried about what would happen when Y2K hit and worried that all of our computers would go full blue of death (I never had any problem making my computer go blue screen of death just by turning it on) others had time to write interesting articles for the Planetarian. While most of us were wishing for Y2K to be over, Sam Muller came up with a "I Wish" list for planetarium shows.

What is always fun to read is what the latest in high tech computers will do. Keven Scott presents a "Report of the IPS Technical Committee". What is interesting is how far computer technology has come in a quarter century. I wish I had ten cents on the dollar for all of the video and computer equipment I purchased over the years...I could retire in piece, or perhaps I should set up a museum of old video and computer equipment.

Computers have taken over most of the day to day projections that at one time were built from whatever was in the junk room, but for those that can't afford all the latest bells and whistles I'll aim you towards Richard McColman's Planettechnica: Building A Better Bolide Projector.

Steve Tidey in his "Forum". Basically should your audience be given the ability for feedback or even control of the direction of the show.

Then if you just got the blue screen of death and if the bulb just blew up coating the inside of your video project, just unwind and read Jane's Corner and read about what a bad day is really like,

45 YEARS AGO (JUNE 1979):

.Mark S. Sonntag writes "A Rational For The Implementation Of A Maximum Impact School Planetarium Facility" in which he developed a curriculum for the first eight years of a typical elementary student. Way back in the dark ages most planetariums relied on an optical/mechanical projector (and I imagine that holds true for today as well) and he presents many of the motions that can be demonstrated by such a device. It would be interesting to compare the class lessons given here with any developed in later years. That study could perhaps be the subject of a paper or a thisus subject. Anyway, if your looking for a good outline for school programs, just review this article.

P. R. People Make Me Nervous! Or (How TpAdvertize Your Planetarium) an article by Philip R. Grocee talks about funding. Since every founding organization at the federal and state level are always looking for ways to save money (usually by cutting funding to your planetarium) one must rely on generating ones own money to stay afloat. One

wonders if any of these have changes and those changes might make for another paper. Anyway, one way to get the word out is to make a PSA for the local TV stations. This is much easier today as most schools have some kind of TV station or at least the equipment to make a simple PSA.

Ruth S. Haag continues in this vain (well...close to it anyway) with "Public Programming, Your Audience Is Your First Priority". This is a good review of who your audience is and what they expect from your programming and what you need to do to keep them happy and coming back for more and more shows. Well worth the review.

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INTERNATIONAL PLANETARIUM'S CALENDAR

COMPILED BY: LORIS RAMPONI

2025

- **3-5 June.** European Network Science Centres & Museums (ECSITE), Annual Conference, Copernicus Science Center, Warsaw, Poland.
<https://www.ecsite.eu/conference>
- **10-12 June.** 10th Fulldome Festival Brno. It will again offer its visitors with the newest content on the fulldome market from all around the world, Brno Observatory and Planetarium, Brno, Czech Republic.
Contact: director@fulldomefestivalbrno.com
fulldomefestivalbrno.com
- **30 June.** Asteroid Day. <https://asteroidday.org/>
- **23-25 July.** Live Interactive Planetarium Symposium, LIPS 2025, Fiske Planetarium, University of Colorado, Boulder, USA. <https://lipsymposium.org/>
- **31 July.** Deadline for the applicants of "A Week in Italy for an American Planetarium Operator", in collaboration with IPS Portable Planetarium Committee.
ips-planetarium.site-ym.com/?page=Italy
- **6 September.** 9th Worldwide Meeting online dedicated to traveling planetariums and in particular to operators, producers and sellers. Begin at 14:00 Universal Time UTC.
Contact: Susan Button, sbuttonq2c@gmail.com; Marco Avalos Dittel, info@planetarioaventura.com
<http://www.ips-planetarium.org/>
- **6-9 September.** Association of Science and Technologies Centers (ASTC), Annual Conference, San Francisco, California, USA. The Conference will be hosted by a consortium of ASTC members: Bay Area Discovery Museum, California Academy of Sciences, Chabot Space & Science Center, Children's Creativity Museum, Computer History Museum, Exploratorium, Lawrence Hall of Science, The Tech Interactive <https://www.astc.org/>
- **10-12 September.** Nordic Planetarium Association, NPA meeting, AHHAA Science Centre, Tartu, Estonia.
Contact: Üllar Kivila, NPA President,
ullar.kivila@ahhaa.ee; <https://www.npa-planetarium.org/>
- **15-19 September.** Association of Brazilian Planetariums, ABP Conference, São Paulo, Brazil.
- **15-19 September.** Digistar User Group, DUG 2025, Thinktank Science Museum, Birmingham Museums, United Kingdom. <https://digistarusersgroup.wildapricot.org/>
- **24-26 September.** Association of French Speaking Planetariums (APLF), Annual Conference, Cosmodrome, Genk, Belgium. From 22-23 September workshop about education. Coordinator Olivier Moreau. Contact: nicolas fiolet. nfiolet@lacoupole.com (APLF) seppe.canonaco@genk.be (Cosmodrome)
www.aplf-planetariums.org
- **7-11 October.** Great Lakes Planetarium Association, GLPA/WAC Conference, Bell Museum, St. Paul, Minnesota, USA. <https://glpa.org/annual-conference/>
GLPA conference is organized with the four regional associations that make up the Western Alliance Conferences. WAC make connections with planetariums west of the Mississippi. The alliance include more than 20 states and the following planetarium organizations: Southwestern Association of Planetariums (SWAP); Pacific Planetarium Association (PPA); Rocky Mountain Planetarium Association (RMPA); Great Plains Planetarium Association (GPPA). <https://www.wacsite.org/>
- **1-4 December.** South American Meeting, APAS Conference, Planetarium USACH, University of Santiago do Chile. In the following days (4-6 December) telescope tour. Contact: apas@planetariochile.cl
<https://www.youtube.com/watch?v=Sbqv62xXGKQ>
- **19-21 December.** Workshop of Planétariums Interactif Associés francophones (PIAf), Marseille, France.
Inscriptions: lionel.ruiz@live.fr Each month, all the year, PIAf Meeting online. Free inscription:
<https://groups.io/g/lss-plane>
<https://planetariums-interactifs.org/>
- **31 December.** Deadline for the contest "A week in the United States". For information and application requirements go to:
www.ips-planetarium.org/?page=WeekinUS
- **31 December.** Deadline for the contest "A week with the GDP". Gesellschaft Deutschsprachiger Planetarien e.V., (GDP) is the Society of German-Speaking Planetaria. For information and application requirements go to:
<https://www.ips-planetarium.org/page/WeekwithGDP>
- **31 December.** Deadline of the prize "Page of stars" organized by IPS Portable Planetarium Committee in collaboration with Serafino Zani Astronomical Observatory. Contact: Susan Reynolds Button.
sbuttonq2c@gmail.com
<http://www.ips-planetarium.org/?page=pagesofstars>

2026

- **31 March.** Deadline of 14th PLANit Prize for an original video production, organized each year by Italian Association of Planetaria (PLANit), Italy. The prize is open to everyone. First prize 500 euro.
Contact: segreteria@planetari.org; www.planetari.org
- **April.** Gesellschaft Deutschsprachiger Planetarien e.V., (GDP), Annual Conference of the Society of German-Speaking Planetaria. Contact: Voss, Björn Dr., bjoern.voss@bkm.hamburg.de; www.gdp-planetarium.org
- **April.** Italian Association of Planetaria (PLANit), 41° National Conference of Associazione dei Planetari Italiani. Contact: segreteria@planetari.org; Dario Tiveron, dario@fddb.org; www.planetari.org

- **7 May.** International Day of Planetariums.
<https://planetarium100.org; ips-planetarium.site-ym.com/?page=IDP>
- **7 May.** Astronomy Day. Astronomy Day is a world-wide event designed to celebrate all facets of astronomy.
<https://www.astroleague.org/astronomyday/news>
- **18 May.** International Museums Day, <http://icom.museum>
- 28th International Planetarium Society Conference, Fukuoka City Science Museum, Fukuoka, Japan.
 - **18-19 June.** Fulldome Festival.
 - **20-21 June.** Council Meeting.
 - **21-26 June.** IPS Conference.
 - **27 June.** Post Conference Tour.
- **12 August 2026.** Total solar eclipse (Arctic, Greenland, Iceland, Atlantic Ocean, northern Spain and very extreme north eastern Portugal).
<https://nso.edu/for-public/eclipse-map-2026/>
- **12 August 2026.** Total solar eclipse (Arctic, Greenland, Iceland, Atlantic Ocean, northern Spain and very extreme north eastern Portugal).
<https://nso.edu/for-public/eclipse-map-2026/>

2027

- **10-19 August 2027.** XXXIII IAU General Assembly, International Astronomical Union, Rome, Italy.
https://www.iau.org/science/meetings/future/general_assemblies/2760/ Access to virtual platform available. See as example: <https://astronomy2024.org/registration/>
- **2 August 2027.** Total solar eclipse (Europe, Africa and the Middle East).
https://en.wikipedia.org/wiki/Solar_eclipse_of_August_2,_2027

2025 PLANETARIUM ANNIVERSARIES

75 years

- **Planetario Agrimensor German Barbato,** Montevideo, Uruguay. The Planetarium is the first founded in South America

50 years

- **Morelia Planetarium,** Mexico.
- **Flandrau Science Center & Planetarium,** Tucson, AZ, USA

40 years

- **Planetario USACH,** University of Santiago do Chile.

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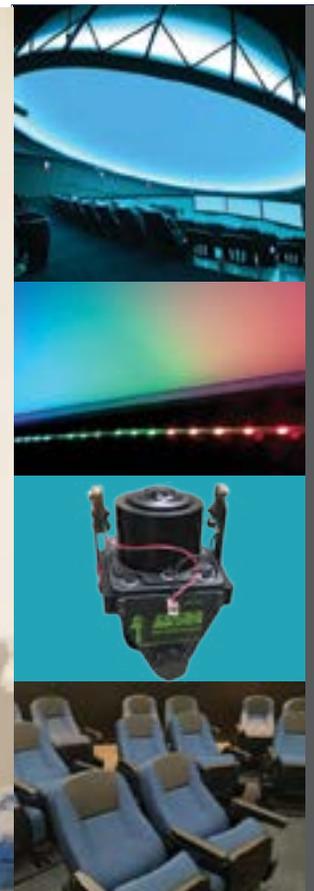
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LAST LIGHT CHATting WITH FRIENDS



April S. Whitt

Fernbank Science Center
156 Heaton Park Drive NE
Atlanta, Georgia 30307 USA
april.whitt@fernbank.edu

During a planetarium Zoom meeting, I noticed the glowing fireplace in Keith Johnson's background. Complimenting him on it, I was told, "It's actually a three-second loop of a rocket launch." And sure enough, when he moved his head, the image was engines blasting off.

Tim Collins reported that several people were commenting on the "planetary alignment" of January 21.

"Pluto's not visible, so it's not a real alignment," being the most common complaint.

Tim was on the centerline for last April's solar eclipse, when, he noted, Pluto was "aligned" during the eclipse. And the Buffalo area was clouded out.

January's occultation of Mars by the Wolf Moon was demonstrated by Stephen Ramsden, using two photographs, and moving the image of Mars behind the Moon image. Labeled, "Not AI. I swear."

From Francine Jackson: "Went to an Astronomy on Tap night yesterday. Do you have them? Lectures on astronomy at different breweries. Lucky they had root beer. Anyway, it was sponsored by Brown Physics, and they had a trivia contest. Yes, we won, but they couldn't figure out who did, because I wrote my name IN CURSIVE! They couldn't read it."

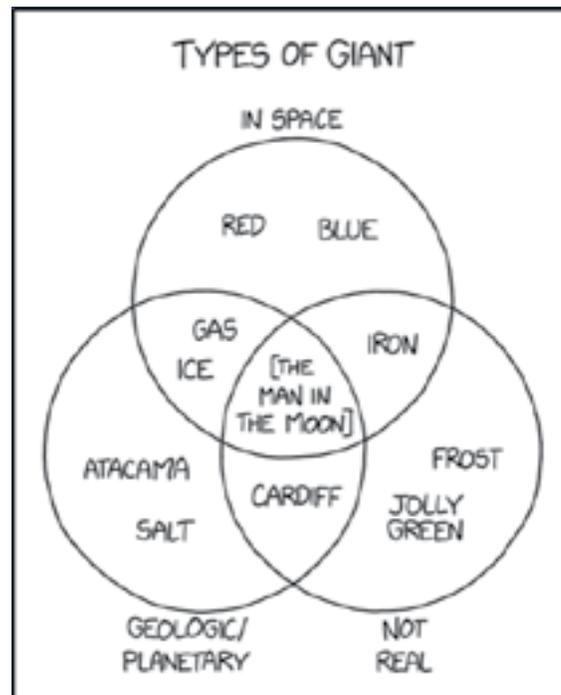
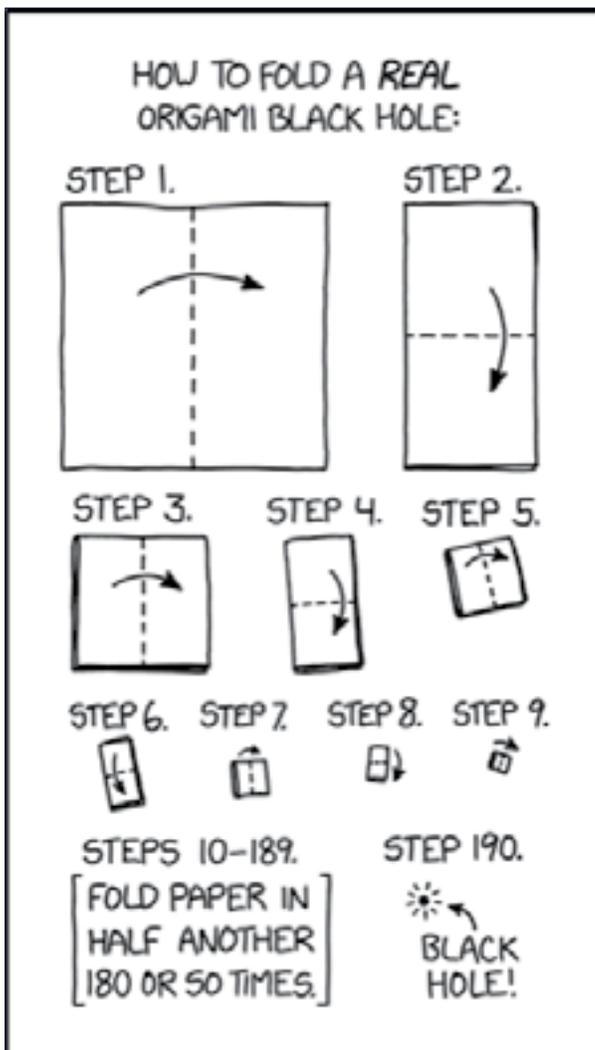
In a recent Smart Stars podcast, Jim Sweitzer noted: "My wish for the next technical innovation for the smart

delivery. Many shoppers would pay a little extra for that feature.... ;-)"

The Astronomical Society of the Pacific offers on-line workshops and discussions, with excellent resources and activities. During the preparation session for the March lunar eclipse (Pi Day on the east coast!), ASP educator Tony Smith demonstrated using Stellarium to show the path of the eclipse. Reversing direction to reset the time, he reminded us that, "I make sure to tell people that they should never see the sky moving like this, from west to east. If you see that, something very bad is happening, and you should probably hold on."

Lee Tinker reported that when he was working at Florida's Hallstrom planetarium with Jon Bell, they discussed the idea of asking Disney for a large grant. Who could say no to the TinkerBell planetarium?

scopes and their vendors is to find a way to eliminate clouds for at least the first week or two after the scope's



(Left) "You may notice the first half of these instructions are similar to instructions for a working thermal nuclear device. After the first few dozen steps, be sure to press down firmly and fold quickly to overcome fusion pressure." (Above) I can't get over the suspicion that all of those viral photos are photoshopped and "Flemish" belongs in the lower right circle.

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