

## ASTRONOMY WITHOUT BORDERS: PLANETARIO ACCESIBLE

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### ABSTRACT

The Buenos Aires Planetarium is a benchmark in the dissemination of astronomy and science. For the Planetarium, the axis passes through the visitors, the most important heritage. Thinking about the different audiences helps to understand the different needs of each one of them and their particularities. We always work in outreach with diversity in mind. In recent years, we have incorporated inclusion as a transversal axis of all our activities. This forces us to be flexible as an institution, with the capacity for permanent changes and adjustments. We are aware that accessibility does not only go through the adaptations that are made in the spaces, so that all people can make use of them with the guarantee of their free mobility, but also through the actions that accompany and promote insertion in the field of astronomy. The Accessible Planetarium grew notably, as we permanently added new programs. In addition to the traditional activities such as the Planetarium for blind and low vision people, the Planetarium for deaf and hard of hearing people, we incorporate Easy Reading, tactile sensory material, haptic plans, accessibility elements in social networks and the web. What gives us great satisfaction is the relaxed function, a novel and unprecedented program in planetariums for people with Autism Spectrum Condition (CEA). For children, we especially offer the Blue Planetarium: One of Pirates, a show adapted as a relaxed function. All this work would not be possible without the advice of the different organizations with experience in the different disabilities. But it also requires the commitment of all Planetarium personnel, and that is why we permanently train ourselves to fulfill a better role in society. From our Planetarium we encourage full participation and promote an Astronomy without borders.

### RESUMEN

El Planetario de Buenos Aires es referente en la divulgación de la astronomía y de las ciencias. Para el Planetario, el eje pasa por los visitantes, el patrimonio más importante. Pensar en los diferentes públicos ayuda a entender las diferentes necesidades de cada uno de ellos y sus particularidades. Siempre trabajamos en divulgación teniendo en cuenta la diversidad. En los últimos años, incorporamos la inclusión como eje transversal de todas nuestras actividades. Esto nos obliga a ser flexibles como institución, con capacidad de cambios y de ajustes permanentes. Somos conscientes que la accesibilidad no pasa solo por las adaptaciones que se hacen en los espacios, para que todas las personas puedan hacer uso de ellos con la garantía de su libre movilidad, sino también por las acciones que acompañan y promueven la inserción en el campo de la astronomía. El Planetario Accesible creció notablemente, ya que sumamos permanentemente nuevas propuestas. Además de las actividades tradicionales como el Planetario para personas Ciegas y de baja visión, el Planetario para personas Sordas e hipoacúsicas, incorporamos Lectura Fácil, material sensorial táctil, planos hápticos, elementos de accesibilidad en las redes sociales y la web, Una de las actividades que nos da muchas satisfacciones, es la función distendida, una propuesta novedosa e inédita en los planetarios para personas con Condición del Espectro Autista (CEA). Para los niños, ofrecemos especialmente, el Planetario azul: Una de piratas, un show adaptado como función distendida. Todo este trabajo no sería posible sin el asesoramiento de las distintas organizaciones con experiencia en las distintas discapacidades. Pero también se necesita del compromiso de todo el personal del Planetario, y por eso nos capacitamos permanentemente para cumplir un mejor rol en la sociedad. Desde nuestro Planetario propiciamos la plena participación y promovemos una Astronomía sin fronteras.

*Key Words:* astronomy outreach — planetarium — sociology of astronomy

### 1. INTRODUCTION

The Buenos Aires Planetarium has built, throughout all these years, an image of reference in the scientific outreach and popularization of astronomy. From the Planetarium we usually offer amazing ex-

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periences and we try to make them unforgettable; we provide learning opportunities, awaking motivation, interest and love for science. Our Planetarium is very successful. We receive a large audience annually in the various offers. Very heterogeneous audiences, of different ages, with different previous experiences, who visit us alone or in groups, as a family, with different time availability, with different knowledge on the subject, with personal points of view, with different motivations and expectations. In cultural spaces, such as museums and planetariums, visitors are considered their most important heritage. Thinking about different audiences helps to understand their different needs, and it is necessary to look at their particularities, creating specific activities for each group that meet different interests and make them feel particularly welcome. The most effective is working with layers of available understanding to cater to different learning needs and expertise. Audience segmentation strategy is driven by the goal of developing criteria that can be used to form homogeneous clusters. From the Buenos Aires Planetarium, we always offer shows of scientific communication, science conventions, lectures from scientists and science communicators, series of astronomy workshops under the planetariums scientific communicators care, podcasts with curiosities and history of science and legends and myths and playlists with space music. We also produce educational and teaching materials for the classroom and children. “Si Muove” magazine is our publication of scientific communication. In the pandemic, the Planetarium developed the Digital Astronomical Communication (DAD) project with accessible resources. The DAD Project aims to transcend barriers related to distance, health, technical and structural facilities and other obstacles regarding cultural, social and economic issues. DAD offers a broader reach thanks to massive access to these activities. It allows an international projection of the programs and initiatives, a stronger Inclusion and New platforms and channels to access the astronomy.

## 2. INCLUSION AS THE AXIS OF ALL OUR ACTIVITIES

We always think outreach with diversity in mind. In recent years, we have incorporated inclusion as a transversal axis of all our activities. When an institution decides to walk the path of accessibility, it must constantly transform itself, be much more flexible, elastic, capable of change. This decision forces us to pay attention and make the necessary adjustments at all times. It is the methodology based on a

work in progress, a laboratory where new strategies are rethought all the time. We understand inclusion as a way of responding positively to diversity and individual differences. Diversity is not a problem, but an opportunity for enrichment. Inclusion in education and outreach is an aspect that reflects social inclusion.

Our Planetarium has become a national and international benchmark in the inclusion of people with disabilities thanks to the implementation of important changes. Since 2001 it has been offering, without interruption, adapted activities. The program “Planetarium for non-habitual audiences” (2001) included activities aimed at different disabilities and, also, at people with different social problems. The Planetarium for the Blind, called “Heaven for All” / El cielo para todos, was the first of these activities. Then followed the first shows for Deaf and hard of hearing people. Not only do we receive visitors at the Planetarium, but we also carry out visits and activities in schools, children’s hospitals and poor neighborhoods. Disability is a relational concept that appears in contact with the environment that often does not provide the necessary support for people to develop fully. Inclusion implies changes in the environment and in the people who make up that community.

## 3. A FRIENDLY PLANETARIUM FROM THE ACTIONS

The Accessible Planetarium incorporated building changes. Access ramps and stair lifts were placed, and an accessible bathroom was built. Spaces for wheelchair users and the magnetic ring, donated by the Mutualidad Argentina de Hipoacúsicos (MAH), for people with hearing aids and a cochlear implant were incorporated into the performance hall. Also, we expanded the free Wi-Fi network in the building and in the park. Our Interactive Museum on the first floor has facilities with the necessary parameters for the free development of those wheelchair users. It also has haptic planes (tactile) with astronomical information. Everything was done without altering the cultural and historical heritage that allows the Planetarium to be one of the most recognized buildings for its architecture. But accessibility is not only the adaptations that are made in the spaces, guaranteeing their free mobility, but also the actions that accompany and promote astronomy. It’s essential to consider instances of education, training and advice of the work teams to understand the best way to accompany visitors, and to have the necessary tools to provide a better service. The commitment of Plan-

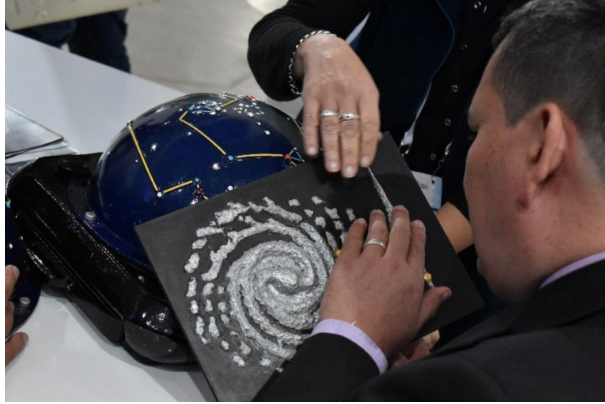


Fig. 1. Tactile astronomical material. Blind person with tactile astronomical material.

etarium team is very important, so we are permanently training. Staff must be trained to be welcoming and offer welcome. We work to make our Planetarium a friendlier space every day.

#### 4. ASTRONOMY FOR ALL

The Planetario Accessible grew notably, always adding new programs and initiatives. One of them is the inclusive Show for Deaf people From the Earth to the Universe, subtitled and in Lengua de Señas Argentina (LSA), which required hard work in conjunction with the Confederación Argentina de Sordos (CAS) the benchmark institution in our country, who adapted astronomical concepts to signs in LSA for the Deaf community. A collaborative work that shows the achievements achieved; an inclusive scientific dissemination material. Both institutions, together with the International Astronomical Union (IAU), and thanks to a call from Dr. Beatriz García, astronomer responsible for the National Node for the Diffusion of Astronomy (NOC-Argentina) at the IAU, we presented in April 2021 new astronomical terms in LSA. The terms were selected by experts as the most used in astronomical education and outreach. The list includes signs in English, Spanish, German, Italian, Portuguese, Japanese, and Polish. The IAU Astronomy Group for Equity and Inclusion is promoting the project of the most common astronomical terms in sign language for the global Deaf community in collaboration with many people and organizations from different countries. The show for Blind and low vision or partially sighted people presents new quality standards, both in materials and in educational advances, as it includes carefully treated complementary colors and sounds. In tactile material, the colors contrast with the background



Fig. 2. Sensory astronomical material. Children learning astronomy with sensory material.

and take a prominent role as a form of communication for people with low vision. But the process goes much further, and brings the concept of color closer to those people who have never seen it. The colors of stars are directly related to their surface temperature. Those that look blue, yellow or red is because they are more or less hot, respectively. An analogy between sound waves and light waves allows us to arrive at the result. The hottest and most energetic stars sound sharper and more strident, and they are bluish. On the contrary, the less hot ones are reddish and sound more muffled and low. This scheme, which sounds a bit arbitrary, has its correlate in nature, although for the people who see it, it often goes unnoticed.

We also incorporate a range of specific activities for Older adults, brain teasers and astronomical exercises for cognitive stimulation, to complete online or download the respective PDF files. We add astronomical dissemination material in the modality of Reader simplified (Lectura fácil) for people with cognitive disabilities; Writings that allow an easier understanding of the content. Include pictograms and images, illustrations and layout for better reception. We are incorporating sensory material and new haptic (tactile) planes aimed at expanding knowledge of the cosmos: the solar system, the Milky Way, eclipses and lunar phases. We work with teachers and students of the Cátedra Diseño de Hábitat Accesible of the UBA - FADU (University of Buenos Aires - Faculty of Architecture, Design and Urbanism) and with the LAB- GCBA (Technological Laboratory).

We trained with the Bocalán Argentina civil association, to learn about assistance dogs for people with disabilities, and we offered the Planetarium as a training place.

#### 5. BLUE PLANETARIUM - RELAXES SHOWS

Since 2018, we offer this novel program: shows adapted to the needs and preferences of children

TABLE 1  
WHAT IS A RELAXED SHOW ABOUT ?

REGULAR SHOW	RELAXED SHOW
Absolute darkness to see the sky well	There is low light during the show. This allows to see the sky too
Visual and sounds effects are part of the show	Visual and sound effects are mild and anticipated
Loud sounds are part of the show	Quiet/nice environment is created thanks to the moderation in sounds
Once show starts, people cannot get in/out the room	ASC people can get in and out the show as many times as they need to
Wander/get up in the middle of the show is not allow	Wander and sit anywhere people feel comfortable is allow

with ASC (Autism Spectrum Condition). The show The pirate was adapted as a relaxed show. We are pioneers in these shows adaptations.

#### Why BLUE PLANETARIUM?

Blue color represents autism. Blue refers to the sea. Sometimes the sea is calm but other times it is not. Some people with ASC (Autism Spectrum Condition) are:

- Hypersensitive to sensory stimulation such as light, sounds, images, etc.
- Hyperactivity
- Lack of concentration
- Little social interaction
- Rigid routines

Table 1 lists the main differences between a regular show and our so-called relaxed shows.

Anticipatory activities: This is very important for ASC person. Any surprised act can unsettle the ASC person and it may create a disruptive attitude. Before the show begins, ASC people can meet the pirate and other characters from the show. In this way, they anticipate the plot and characters. Planetarium works side by side with TGD PADRESTEA and the ONG BRINCAR for a happy childhood. But it also requires the commitment of all the Planetarium staff, and that is why we train permanently. The “Planetario accessible” includes all this set of inclusive programs. We permanently present sustainable programs, an agile tool to bring astronomy closer to

to people with disabilities. The Planetarium is conceived and thought as a space for everyone. This makes it more accessible and with greater social value, since it offers more opportunities for enjoyment and learning. Since 2018, the Planetarium has received the Certificate of Distinction for the implementation of the Accessibility Guidelines Program, granted by the Tourism Board of the GCBA and the Nation. The Guidelines constitute a frame of reference to improve the quality of care for the public with disabilities and to promote accessible tourism. Astronomy is a subject that every person should be able to learn about and enjoy. There are a lot of things we can do to make the building, the contents and accessible communication to everyone. We work to achieve an Inclusive Planetarium and Astronomy Without Borders.

Finally, we will present some relevant details concerning the team and material to get more information about the contents which are part of these projects.

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 Contact: planetarioaccesible@gmail.com  
 Planetarium BA more accessible web  
 Accessibility “Festejando el hacer CORTO”  
 Older adults  
 ISSUU  
 Inclusive Show 360  
 Presentation of the inclusive show  
 New astronomical terms in LA incorporated