

# The stars were just the beginning

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## **Keywords**

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Thousands of planetariums around the world help to engage with public audiences each day and serve as essential science gateways. Starting in October 2023 and lasting through May 2025, the international planetarium community will celebrate its first Centennial and look forward to the next one hundred years of dome-based education and entertainment. While technology has changed dramatically in the past century, the core mission of the planetarium has not changed: to provide a window into the Universe and to tell the stories that gift us all with a better understanding of our place in the Cosmos.

## **Introduction**

Today, we have more than 4,000 planetariums all over the world, varying in size from small family businesses to large institutions with dozens of employees. These planetariums run with simple fisheye projectors, built by local enterprises or using the most modern technology, with multiple projectors that provide the highest resolution images and are immersed in a fabulous sound system, all assembled together and controlled by a number of computers. Fixed or mobile, planetariums fascinate more than 140 million people yearly, from the youngest child hungry for science news to seniors excited to share stories about the sky.

The story we tell today was built over a century, and, of course, it has evolved over the years. Not only has technology changed, but our knowledge about the Universe and society has changed itself, pulling planetariums to new heights. All of these changes have drawn the skills of a professional called a planetarian. We can think of a planetarium as a body made of a dome and seats, the main computers acting as the brain, connected to lighting and sound systems, all of which is, in turn, and connected to the heart – the projection system. In this complex system, the planetarian could be the soul.

## **The essentials of being a “planetarian”**

For a long time, during the epoch of optical mechanical systems, the planetarian was behind the control system, pushing buttons

connected to complex electronic devices. The planetarian should know much more than astronomy; in the early days, one could expect abilities in optics and electronics. Today, in the computer era, the planetarian is expected to program a show in a planetarium system and update the system right after new discoveries.

In any epoch, a planetarian communicates astronomical content. From small domes to giant complex systems, each planetarium has a professional who knows how to operate the projector, speak with the public and understands astronomy. The planetarian is expected to transform stories, with all their complexities, into understandable content for young children and senior visitors, alike. The planetarian is a little bit of an actor, and, in many cases, the planetarian is also the director. Some planetariums are small family businesses, and one person plays the roles of the planetarium director, the planetarian, the cleaner, the electrician, the ticket taker and much more.

There are university planetariums where professors and technicians run the planetarium as directors and planetarians. There are city or state public planetariums with teachers or specially hired people working in the planetarium. Finally, there are private planetariums in small or big cities with dozens or even one hundred employees.

In this scenario, planetarian skills include the ability to mount a telescope outside for open-air activities, launch a water rocket

and carry heavy equipment. Another challenge to each planetarium director is to select new planetarians and train new staff. As the planetarian can be thought of as the soul of a planetarium, an excellent presenter or operator will certainly excite your audience and help them fall in love with science and astronomy.

## **Planetariums today**

During the past one hundred years, our society has developed new concerns, and planetariums have acquired new responsibilities. Today, we face climate change, and this has been introduced into many planetarium shows, looking straight to Earth or through the observation of the climates of Venus and Mars. In addition, planetariums are walking into a more inclusive world. Today, we find examples of shows specially designed for people on the autism spectrum, wheelchair-friendly places and shows for the deaf and hard of hearing and those with blindness and low vision.

At the same time, the planetarium industry consists of manufacturers, show producers, planetarium staff, and millions of people in the audience. A relatively low-cost mobile planetarium can cost around 20,000 USD, while the most advanced equipment can cost up to 10 million USD, independent of the infrastructure (the building). We estimate that more than 4,000 planetariums, tens of planetarium producers and scores of show producers can be responsible for about

3 billion USD per year and tens of thousands of direct jobs.

Planetarium associations flourish in this huge planetarium world, including the International Planetarium Society (IPS), founded in 1970. Over 500 people and institutions from 50 countries are affiliated with the IPS, a global association of planetarium professionals with the mission to provide the planetarium community professional development, science literacy and arts and humanities awareness, innovative ideas, and partnerships to enhance the world's appreciation and understanding of our Universe.

The values of IPS also reflect the understanding of the place that planetariums hold in the arenas of science communication and public outreach: science as a way to understand the world; inclusivity of and respect for cultures; sharing knowledge; openness to discovery and new ideas; service excellence; and leadership in our field.<sup>1</sup>

In addition to the meetings organised every two years, IPS promotes cultural exchange by offering opportunities for planetarians to visit planetariums in other countries. The organisation also helps to facilitate sharing planetarium content and resources with its affiliates, and each quarter publishes *Planetarian*, the official journal of IPS. Perhaps most importantly, IPS facilitates ongoing community professional development with special committees, such as the Education Committee, the Equity, Diversity and Inclusion Committee, and the Mobile Planetariums Committee.

The present planetarium world has become something far different from what Oscar von Muller, the founder of the Deutsches Museum in Munich, imagined when he ordered an instrument that could reproduce the night sky.

### A brief history of the planetarium

ZEISS designer Walther Bauersfeld accepted the task of transforming von Muller's vision into reality and was responsible for developing the projector that gave its first light on 21 October 1923. Later, the Model I projector, as it was called, was installed in the Deutsches Museum and opened to the public on 7 May 1925. For this

reason, from October 2023 to May 2025, the planetarium community invites the whole world to celebrate the invention that brought the heavens down to Earth.

Though the Model I projector was designed to reproduce the northern hemisphere sky, later planetarium projectors were developed to reproduce the whole sky. Planetariums started to spread all over Europe, and the first planetarium inaugurated outside Europe was the Adler Planetarium in Chicago, USA, in 1930. New planetariums were installed around the world while other companies started to develop their own projectors.



*The modern planetarium not only illustrates the entire Universe, but it also allows the presentation of diverse topics including science, culture and art. Image Credit: Cosm*

As humankind started to reach further into the heavens and learn more and more about the Universe with space exploration and huge telescopes, the planetarium industry was pushed to new developments. First, new types of auxiliary projectors were developed and later, following the technological innovations, planetariums went through a great revolution, going from opto-mechanical apparatuses to digital systems. This revolution took nearly 30 years, culminating in the development of completely digital full-dome systems and shows by the 1990s.

Today, planetarium domes can be as large as 35 meters in diameter, working with a

complex computer system to control 20 computers with a 10K video resolution, a 48-channel sound system and ambient light systems. Not only are planetariums able to reproduce the night sky, but they can drive the audience on a voyage through the Solar System, the Milky Way, and beyond. Planetariums can land you on a recently discovered exoplanet, follow the launch of the most advanced mission, and rescue you from a black hole.

### Conclusion

The planetarium audience can fly even further when they look inward toward a world that needs so much attention: a world facing climate change, wars, racism, xenophobia, and extreme poverty. Today's planetariums are spread all over the world, not only sharing the mysteries of the cosmos but helping society to face its worst fears. What's next for another century of history? Perhaps higher resolution images, OLED screens instead of a projector, augmented reality or a holographic planetarium? Will planetariums become islands or roots that spread, scatter and are the fountains of knowledge in our society? We invite you to find out for yourself and discover one of the more than 4,000 planetariums spread around the world.

### Notes

<sup>1</sup> International Planetarium Society "About Us": [https://www.ips-planetarium.org/page/about\\_us](https://www.ips-planetarium.org/page/about_us)

### Biography

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**Michael McConville** is the President of the International Planetarium Society, the founder of the *Dome Dialogues* online planetarium community, and the Director of Customer Outreach for the planetarium company Cosm.