

# Celebrating the Centennial of the Planetarium – Reflections and innovations in the planetarium community in Kuwait

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In celebration of the planetarium's 100th anniversary, this article offers a case study of the Sheikh Abdullah Al Salem Cultural Center Planetarium. The planetarium emerges as a paramount symbol of the enduring significance of these celestial learning centres, uniquely positioned to champion astronomy education and the preservation of the pristine night sky. Through innovative initiatives and immersive experiences, this planetarium inspires the next generation of scientists and illuminates the path to a future shaped by scientific curiosity and cosmic exploration.

## Introduction

As we celebrate the planetarium's centennial anniversary, it is important to recognise the vital role that planetariums play in promoting scientific literacy and public engagement. The planetariums of today are continuing to evolve in innovative ways to inspire and educate audiences of all ages and backgrounds. As the largest planetarium in Kuwait, Sheikh Abdullah Al Salem Cultural Centre Planetarium has been at the forefront of these efforts nationally, continuously pushing the boundaries of what is possible in planetarium design and programming.

Leading the planetarium at Sheikh Abdullah Al Salem Cultural Centre, we have witnessed firsthand the transformative power of a planetarium experience. In this article, we will share some valuable lessons we have learned and the innovative ways our planetarium continues to evolve in its mission to educate and inspire.

This article celebrates the 100th anniversary of the planetarium and reflects on the lessons learned by the planetarium leads at Sheikh Abdullah Al Salem Cultural Centre. It also explores the role of the planetarium in promoting astronomy education and preserving the night sky as dark sky oases. We introduce the planetarium at Sheikh Abdullah Al Salem Cultural Centre as a case study. This article discusses the challenges of establishing and growing a planetarium, including adapting to the pandemic, promoting diversity and inclusivity, and the

need to provide meaningful experiences for people with impairments. We highlight the Centre's cultural contributions to Arabic, Islamic, and Kuwaiti astronomy, its collaborations with local organisations and its participation in international events.

## Sheikh Abdullah Al Salem Cultural Centre

Sheikh Abdullah Al Salem Cultural Centre, a cultural hub in Kuwait, was established in 2018 to foster a love for art, science, culture, and entertainment among its visitors. We realise this mission by creating a series of world-class museums, a fine arts centre, and a theatre, aiming to position Kuwait as a prime cultural destination. Covering over 120,000 square metres, the Centre is home to an array of more than 3,000 exhibits spread across 22 galleries. With a tradition of welcoming an average of 250,000 visitors annually, the Centre recently achieved a significant milestone by extending its warm embrace to its millionth visitor, further cementing its status as a premier destination for cultural enrichment and knowledge dissemination.

The vision of Sheikh Abdullah Al Salem Cultural Centre is to embrace and showcase the diversity of the world's finest cultural achievements by maintaining a state-of-the-art museum complex. The complex comprises unique components, including the Natural History Museum, Science and Technology Museum, Arabic Islamic Museum, Space Museum, Fine Arts Centre, and Theatre. However, in this article, we will

be delving into two of the most captivating attractions within the Centre: The Planetarium and the Space Museum.

The Space Museum is an exceptional destination for space enthusiasts and learners, featuring 131 exhibits across its three main galleries. Visitors can explore various space artefacts, such as replicas of space vehicles, spacecraft, space suits, and equipment. In addition, the museum provides interactive displays and exhibits that provide visitors with a hands-on experience of space exploration. The exhibits are organised to cater to all age groups and learning levels, making the Space Museum a valuable resource for both families and educational institutions seeking to expand their knowledge of space science and technology.

The Planetarium, situated at the heart of the Space Museum (see Figure 1) and celebrated as one of the most captivating attractions at the Sheikh Abdullah Al Salem Cultural Centre, welcomes an average of 3,000 visitors annually. With a 19-metre diameter, the planetarium offers visitors a fascinating immersive experience through the cosmos. The facility has a maximum capacity of 107 visitors, including four designated seats for visitors with special needs. The planetarium features an advanced projection system, which includes five projectors, creating a stunning display of realistic 3D images of the night sky. The theatre's dome-shaped ceiling is covered with a high-resolution screen tilted at a



**Figure 1:** Left: The Planetarium is immersed within the Space Museum, creating a harmonious astronomical experience. Right: The Planetarium's main entrance door beckons visitors into a world of celestial wonder. Image Credit: Sheikh Abdullah Al Salem Cultural Centre

20-degree angle, allowing for a breathtaking display of the Solar System, galaxy, and beyond. Visitors can sit back and enjoy a variety of educational and entertaining programmes, including astronomical lectures, shows about the prominent astronomical legacy of Arabia and its contribution to the identification of the stars, and many more.

The Planetarium and the Space Museum, while distinct in function and form, harmoniously coalesce into an indivisible unit, pulsating with the same celestial narrative. It is the epicentre where the captivating astronomical wonders, meticulously curated within the museum's halls, seamlessly meld with the immersive experience. This intentional amalgamation is born from a strategic vision crafted to foster a dynamic synergy. It is a deliberate orchestration, igniting a profound interplay of knowledge and wonder, where the tangible exhibits stand as testaments to the past and present. At the same time, the Planetarium propels visitors into awe-inspiring and educational journeys of the future.

Within this symbiotic relationship, the Space Museum is a foundational knowledge repository, offering visitors a comprehensive understanding of the celestial marvels that await exploration. It lays the intellectual groundwork, presenting historical, scientific,

and cultural contexts that enrich one's appreciation of the cosmos. The museum sets the stage, sparking curiosity and illuminating pathways for deeper inquiry.

In contrast, the Planetarium is an immersive vehicle, translating acquired knowledge into an experiential odyssey. Having absorbed foundational knowledge from the museum, visitors step into the Planetarium to witness the vastness of space firsthand. The astronomical concepts gleaned from the museum come alive in the Planetarium's dome, captivating and educating in equal measure.

This dual entity, the Space Museum and the Planetarium, engages visitors in a holistic intellectual and sensory embrace. The museum instils the understanding, while the Planetarium elevates it to a visceral encounter, creating an educational tapestry that is both informative and immersive. Together, they embody an educational ecosystem that resonates with enthusiasts, students, and the curious alike, enriching their cosmic journey within the walls of the Cultural Centre.

The Space Museum and Planetarium at Sheikh Abdullah Al Salem Cultural Centre offer visitors a unique and engaging experience that combines education and entertainment. The facilities are not just for

those with a passion for astronomy or space exploration but for anyone who wants to learn about the history and science of our universe.

The Centre also hosts several events and activities throughout the year, including lectures, workshops, school tours, and stargazing sessions (see Figure 2). These events provide visitors with an opportunity to interact with experts in the field of astronomy and learn more about the latest developments in space exploration.

Establishing a planetarium is no small feat and requires careful planning and attention to detail. One of the critical considerations is choosing the right equipment and technology to ensure a high-quality viewing experience for visitors. The planetarium systems at Sheikh Abdullah Al Salem Cultural Centre are among the most advanced and sophisticated in the world, employing cutting-edge technology to provide visitors with a truly immersive and engaging experience. The Centre's planetarium systems include two separate platforms, which offer high-quality visual and audio, as well as advanced dome projection and image blending capabilities. Together, these systems allow the planetarium to present a wide range of immersive and engaging shows, from stunning visual tours of the universe to interactive educational experiences that help visitors better understand the mysteries of space and the cosmos.

### Promoting diversity and inclusivity

Planetariums can be critical in promoting diversity and inclusivity in science education and public outreach. The Sheikh Abdullah Al Salem Cultural Centre Planetarium is a good example of how planetariums can cater to the needs of visitors with disabilities, including those with blindness, low vision, physical disabilities, or those who are hard of hearing. We achieve this by providing specialised programmes and tours that incorporate tactile experiences, audio descriptions, and other accommodations. These efforts ensure that everyone has the same opportunities to learn and explore the Universe.

Moreover, planetariums can be a powerful resource for promoting diversity and inclusivity in science education by highlighting the achievements of scientists and researchers from diverse backgrounds,



**Figure 2:** The Planetarium at Sheikh Abdullah Al Salem Cultural Centre captivates audiences with a breathtaking live show. Image Credit: Sheikh Abdullah Al Salem Cultural Centre

including women and other underrepresented groups in science, technology, engineering, and maths (STEM) fields. By showcasing the contributions of these individuals, planetariums can inspire the next generation of diverse scientists and researchers while breaking down barriers and increasing awareness and appreciation of diversity in the field.

In addition to showcasing diversity in astronomy, planetariums can also promote understanding and appreciation of different cultures and perspectives. For example, the Sheikh Abdullah Al Salem Cultural Centre Planetarium highlights how different cultures have viewed and interpreted celestial phenomena throughout history, such as how ancient civilisations used the stars for navigation and timekeeping. By providing a platform for diverse perspectives and experiences, planetariums can foster greater understanding and appreciation of the richness and complexity of the human experience.

#### **A cultural tribute to Arabic and Kuwaiti astronomy**

The Planetarium at Sheikh Abdullah Al Salem Cultural Centre offers an informative and entertaining tribute to Arabic, Islamic, and Kuwaiti astronomy. Arabic astronomy has a rich history dating back to ancient times, and this planetarium experience

offers a comprehensive exploration of this fascinating field of study.

The journey through the Planetarium's exhibits is a comprehensive exploration of Arabic astronomy's historical and scientific significance. Visitors can learn about the various scientific discoveries made by Arabic astronomers, including the use of mathematical principles to chart the movements of the planets and stars.

Furthermore, the Planetarium and Space Museum experience delves into the various instruments used by Arabic astronomers to make their observations. These include the astrolabe, a device used to measure the altitude and azimuth of celestial bodies, and the sextant, used to determine the altitude of the Sun and stars. Among these remarkable instruments, the exhibition also highlights the Celestial Globe crafted by the renowned Arabic astronomer Abdulrahman al Sufi, offering visitors a glimpse into the intricate celestial mappings and astronomical knowledge of the past.

One of the most compelling aspects of the Sheikh Abdullah Al Salem Cultural Centre Planetarium experience is its presentation of Arabic astronomical achievements in the context of broader cultural and scientific movements. Visitors learn about the significant contributions Arabic astronomy

has made to the scientific community, as well as the impact it has had on the broader culture of the region.

In addition, the Planetarium and Space Museum at Sheikh Abdullah Al Salem Cultural Centre play a vital role in promoting the astronomy legacy of Kuwait by serving as a tribute to the rich astronomical history of Kuwait, showcasing the achievements of Kuwaiti astronomers and scientists through its exhibits and programmes. The Centre's exhibits, especially the Galaxies Traveller Exhibit, include a comprehensive history of astronomy in Kuwait, highlighting the contributions of Kuwaiti astronomer, Saleh Al-Ojairi, to the field. Through these exhibits, visitors gain an appreciation for the significant role that Kuwait has played in advancing astronomical research and knowledge.

Throughout the Space Museum and Planetarium experience, visitors are encouraged to engage with the exhibits and ask questions about the rich history and scientific discoveries of Arabic, Islamic, and Kuwaiti astronomers. The planetarium experience is designed to be an interactive and engaging exploration of astronomy that leaves visitors with a newfound appreciation for the field.

The Sheikh Abdullah Al Salem Cultural Centre Planetarium is important to Kuwait's cultural heritage, promoting the country's rich astronomical legacy to local and international audiences. The Centre's commitment to providing visitors with an immersive and interactive experience is a testament to Kuwait's ongoing dedication to promoting scientific education and exploration. As such, the planetarium serves as a tribute to the past achievements of Kuwaiti astronomers and scientists while inspiring the next generation of scientists to continue pushing the boundaries of astronomical research and knowledge.

#### **Honouring contributions and empowering women**

Sheikh Abdullah Al Salem Cultural Centre, represented by the Space Museum, extends its dedication to celebrating women's achievements by actively participating in the United Nations' International Day of Women and Girls in Science. On this significant occasion, the Centre devotes an entire programme to enlightening young girls about the

remarkable contributions of women scientists from the past and present. Through engaging workshops and insightful talks, young minds are immersed in the inspiring stories and accomplishments of these prominent figures, such as the First Female Astronaut, igniting their curiosity and enthusiasm for scientific pursuits. Furthermore, the Centre takes pride in its commitment to highlighting the enduring role of women in Islamic history with a series of workshops and discussions that shed light on the invaluable contributions of women throughout the ages. By nurturing young talents and fostering an appreciation for women's accomplishments, Sheikh Abdullah Al Salem Cultural Centre continues to champion the role of women in Kuwaiti society and beyond.

#### **The power of planetariums in inspiring future generations**

Research has shown that planetariums significantly impact science education and engagement. Various studies have found that planetariums are effective in increasing students' understanding of astronomical concepts and improving their attitudes towards astronomy and science (e.g., *Plummer, 2009; Türk et al., 2016; Slater & Tatge, 2017*).

Planetariums are thus a powerful tool for inspiring the next generation of scientists and researchers. By offering immersive and interactive learning experiences, planetariums can engage visitors of all ages and backgrounds and spark curiosity and interest in STEM fields. Through cutting-edge technology and innovative programming, Sheikh Abdullah Al Salem Cultural Centre Planetarium creates an educational and inspiring environment, encouraging visitors to explore the wonders of the universe and discover new possibilities for scientific discovery and exploration.

Furthermore, planetariums can also play a crucial role in promoting space exploration. With the increasing interest in space travel and the growing importance of space-based technologies, planetariums can help to educate the public about the potential of space exploration to address some of our world's most pressing challenges, such as climate change and resource depletion. By providing immersive and interactive learning experiences, planetariums can

spark curiosity and interest in STEM fields, inspiring the next generation of space explorers and scientists.

Moreover, planetariums can also serve as a platform to raise awareness about the need for greater diversity and inclusivity in science education and careers, which can help to ensure that the benefits of space exploration and scientific advancements are available to everyone, regardless of their background or abilities.

For Example, the Astronomers Diwaniya, a monthly rendezvous at the Planetarium and Space Museum, is a testament to the potent influence of knowledge and shared passion. This monthly gathering brings budding astronomers and seasoned stargazers into the Planetarium and Space Museum. Participants of all ages and backgrounds gather to discuss celestial wonders, planetary phenomena, and space exploration's latest updates. Expert insights and spirited discussions enrich each gathering, stimulating a profound appreciation for the mysteries of the Universe. Through the Astronomers Diwaniya, the Planetarium and Space Museum not only cultivate a robust sense of community among space enthusiasts but also propel the intellectual exploration of the cosmos, imparting a lasting impact on the next generation of scientists.

Moreover, the Planetarium orchestrated a live show that transported audiences on a cosmic journey through our Solar System. The meticulously crafted presentation shed light on the intricate details of each planet, offering a deep dive into the wonders of our local neighbourhood. Additionally, the event served as a poignant tribute to the monumental achievement of the Apollo 11 mission, a triumphant landing on the Moon's surface that etched itself into humanity's history. This immersive experience illuminated the remarkable past and kindled an insatiable curiosity about the boundless prospects of future space exploration.

Therefore, the Sheikh Abdullah Al Salem Cultural Centre Planetarium offers a unique and immersive learning environment that inspires visitors to explore the universe and pursue careers in science and technology. It is crucial in promoting science education and engagement, space exploration, and diversity and inclusivity in science education.

#### **Planetariums as a tool for addressing global challenges**

Planetariums are critical in addressing global challenges such as climate change, biodiversity loss, and light pollution (e.g., *Wyatt, 2013; Yu et al., 2013; Kamal, 2022*). These challenges pose significant threats to the planet and its inhabitants, and planetariums can raise awareness and inspire action to mitigate their impact. Through immersive experiences and educational programmes, planetariums can help visitors better understand the complex systems that govern the natural world and the impacts of human activities on the planet. As institutions that promote science education and engagement, planetariums can raise awareness and inspire action on these pressing issues.

#### **Awareness and advocacy of environmental issues**

The Sheikh Abdullah Al Salem Cultural Centre encourages advocacy to promote awareness and inspire action on critical issues by collaborating with organisations and initiatives focused on environmental sustainability. The Planetarium serves as a platform for dialogue and discussion, bringing together stakeholders from diverse backgrounds to collaborate and find solutions to these challenges.

In its unwavering commitment to addressing pressing global challenges, the Sheikh Abdullah Al Salem Cultural Centre Planetarium takes a proactive stance by hosting enlightening lectures dedicated to shedding light on climate change and renewable energy. These lectures offer a platform for experts and scholars to delve into essential topics such as the Al-Sarayayt season in Kuwait, the local thunderstorm season during Spring, and the underlying reasons behind climate fluctuations. With a primary objective of raising awareness and promoting informed discourse, the Centre collaborates with distinguished institutions such as the Directorate General of Civil Aviation in the State of Kuwait to ensure the highest calibre of expertise. Through these sessions, the Planetarium enables a deeper understanding of the intricacies of our changing climate and the pivotal role of renewable energy in securing a sustainable future. These lectures inform and inspire a collective commitment to addressing the environmental challenges of our time.

### **Adapting to the Covid- 19 pandemic**

The Covid- 19 pandemic has profoundly impacted cultural institutions worldwide, and Sheikh Abdullah Al Salem Cultural Centre has not been immune to these challenges. With the closure of physical exhibition spaces and restrictions on public gatherings, the Centre had to adapt quickly to new modes of engagement with its visitors, including virtual tours and online resources allowing visitors to explore the exhibitions from the safety and comfort of their homes.

One of the key strategies that Sheikh Abdullah Al Salem Cultural Centre adopted during the pandemic was virtual calls to engage with visitors in real-time. These calls allowed visitors to connect with the Centre's educators and curators, who could guide them through the exhibitions and answer any questions. The team used various multimedia resources to support these virtual tours, including high-resolution images, videos, and 3D models that provided a comprehensive and immersive experience. The virtual tours also featured detailed information panels that provided context and historical background, making the exhibitions visually engaging and intellectually stimulating. Virtual calls also allowed the Centre to connect with visitors from around the country, making the exhibitions accessible to a broader audience than ever before.

Amid the challenges posed by the Covid-19 pandemic, Sheikh Abdullah Al Salem Cultural Centre embarked on a pioneering initiative by introducing a virtual summer camp run by the Space Museum, tailored to engage children in exploring the wonders of space and space exploration. The camp was structured to accommodate children of varying ages and backgrounds, ensuring a customised learning experience. Young participants delved into captivating topics, including the *International Space Station (ISS)* and the Solar System, under the guidance of the Centre's educators. While the transition to a virtual format came with unique challenges, notably requiring parents to prepare certain items for their children to participate in the interactive workshops, the summer camp maintained its success by closely measuring engagement levels and the knowledge acquired by the young participants. By actively involving children and evaluating their learning experiences, Sheikh Abdullah Al Salem Cultural Centre sustained the

annual tradition of inspiring and educating young minds, even during the trying times of the pandemic.

### **The importance of planetariums as dark sky oases**

Light pollution is a severe issue worldwide that hinders astronomical observations and negatively affects the natural environment and human health. In addition to serving as a venue for scientific education and outreach, planetariums also play an essential role in preserving the natural beauty of the night sky. Thus, the role of planetariums as dark sky oases is vital, as they provide an unobstructed view of the night sky, free from the interference of artificial light. This allows visitors to experience the beauty of the Universe while learning about astronomy in a controlled environment.

Moreover, planetariums can play a crucial role in raising awareness about global challenges and the fight against light pollution. They provide a perfect venue to educate the public about the negative impact of light pollution, raise awareness among visitors and promote sustainable lighting practices. Sheikh Abdullah Al Salem Cultural Centre, represented by the Space Museum and Planetarium, collaborates with local communities to encourage implementing policies and regulations that reduce light pollution. The Centre has formed strategic partnerships with several prominent local organisations (discussed below) to promote responsible lighting practices and increase public awareness regarding the detrimental effects of light pollution and other global challenges. We also host regular stargazing events and workshops to help people better appreciate the night sky and develop a deeper connection to the cosmos.

In a dedicated effort to combat the pervasive issue of light pollution and its detrimental effects on the night sky, Sheikh Abdullah Al Salem Cultural Centre has initiated an enlightening lecture entitled 'Light Pollution and its Dangers to the Night Sky.' This illuminating session, curated for children aged 6 to 14, is a platform for education and awareness. We called upon the expertise of the IAU National Outreach Coordinator for Bahrain, Myriam Alqassab, as the key speaker, ensuring the highest quality of information dissemination. Such lectures not only empower the younger generation

with knowledge about the importance of preserving the natural beauty of the night sky but also illuminate the perils of light pollution, thereby instilling a sense of responsibility towards sustainable lighting practices from an early age.

Additionally, the Centre organises special trips outside the city's light-polluted areas, providing visitors with a firsthand experience of starry night sky unencumbered by light pollution. These experiences leave a lasting impact, deepening the connection between visitors and the celestial wonders above while emphasising the urgency of preserving the night sky for future generations.

### **Collaborations with local organisations and international participation**

Sheikh Abdullah Al Salem Cultural Centre has formed a strong collaboration with local organisations to enhance its Planetarium's educational outreach and provide the public with an immersive and interactive learning experience, including the Youth Public Authority, which aims to provide the youth of Kuwait with opportunities for personal and professional growth through educational and cultural programmes. Kuwait University, a leading institution of higher learning in Kuwait, has been actively collaborating with the Centre, represented by the Space Museum and Planetarium, to provide scientific and technical expertise in astronomy and related fields.

The Kuwait Institute for Scientific Research, which focuses on scientific research and development, has partnered with the Centre to provide valuable scientific insights and data for the Planetarium's educational programmes. This collaboration extends to programmes such as "Renewable Energy in Kuwait" and "Introduction to Nanotechnology and Its Applications," offering visitors a comprehensive understanding of cutting-edge scientific advancements. The Kuwait Meteorological Department, the government agency responsible for monitoring and forecasting weather and climate conditions in Kuwait, has also played an active role in the Space Museum and Planetarium by providing relevant meteorological data and research.

Furthermore, the Ministries of Education and Information in Kuwait have supported

the Space Museum and Planetarium by promoting educational programmes and providing valuable resources to enhance the public's learning experience. The Space Museum initiative has forged a significant partnership with the Kuwait Foundation for the Advancement of Sciences (KFAS), a revered non-profit organisation propelling scientific research and development in Kuwait. This collaboration has birthed a transformative youth volunteering programme to transcend traditional roles. Beyond mere volunteerism, this initiative offers young enthusiasts a platform to actively engage with the museum's profound mission, infusing their journey with meaningful contributions. The program immerses them in the captivating realms of science and culture, imparts hands-on experience, and enriches their understanding. In alliance with KFAS, the initiative strives to cultivate a new generation of scientific enthusiasts and cultural champions, instilling a profound appreciation for the boundless world of knowledge and exploration.

In addition to its local collaborations, the Planetarium has also engaged with international organisations, such as the International Astronomical Union (IAU). Sheikh Abdullah Al Salem, Cultural Centre Planetarium, participated in the NameExoWorlds 2022 competition organised by the IAU — the event aimed to involve the public in naming new planets outside our solar system.

Furthermore, the Centre's active participation in prestigious international events underscores its commitment to fostering scientific literacy and astronomical appreciation. Notably, the Planetarium and Space Museum organised a captivating evening dedicated to Moon observation, aligning with the global celebration of the International Observe the Moon Night. During this event, visitors were taken on a journey, delving into the mysteries of our celestial neighbour, the Moon. They gained insights into lunar observation techniques, the Moon's rich history, and the remarkable saga of human space missions to lunar landscapes.

As part of its collaborations with these organisations, the Planetarium and Space Museum has been able to organise and participate in various educational events, workshops, and exhibitions, all aimed at

increasing public awareness and understanding of astronomy and related fields. These events are tailored to cater to different age groups and backgrounds, ensuring that everyone can learn and explore the wonders of the Universe.

The relationships the Planetarium and Space Museum have built with local and international organisations demonstrate the Centre's commitment to promoting public engagement in astronomy and space exploration. The Planetarium's collaborations have also enabled it to develop educational programmes and resources tailored to Kuwait's unique cultural and environmental context. Through these collaborations, the Centre's planetarium has become a valuable resource for the local public, providing a platform for science communication and public engagement and promoting scientific literacy and critical thinking skills.

## Conclusion

As we look to the future, many exciting opportunities and challenges face planetariums worldwide. From advancing technologies to changing social and cultural norms, there is no shortage of factors that will shape the future of planetariums and their role in society. However, whether through innovative programming, cutting-edge technology, or community partnerships, planetariums will remain an important source of inspiration and wonder for people of all ages and backgrounds.

As we celebrate the Centennial of the Planetarium, we reflect on the rich history and continued relevance of planetariums in contemporary society. The planetarium at Sheikh Abdullah Al Salem Cultural Centre in Kuwait is an exemplary model for planetariums, showcasing innovative technology, a cultural tribute to Arabic, Islamic, and Kuwaiti astronomy, and promoting diversity and inclusivity. However, planetariums face global challenges, such as combatting light pollution. They must continue to be dark sky oases — recent advancements in planetarium technology promise to further enhance the field's ability to engage and educate audiences. As we look towards the future, planetariums will play a vital role in shaping the next generation's understanding of the cosmos and our place within it.

## References

- Kamal, F., Stern, H. L., Johns, D., & Strickland, Z. (2022). Engaging Students and the Public in Polar Research through Live Interactive Planetarium Shows [Abstract]. *AGU Fall Meeting Abstracts, 2022*, ED52A–05.
- Plummer, J. D. (2009). Early elementary students' development of astronomy concepts in the planetarium. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching*, 46(2), 192–209.
- Slater, T. F. and Tatge, C. B. (2017). *Research on teaching astronomy in the planetarium*. Springer International Publishing.
- Türk, C., Kalkan, H., Iskeleli, N. O., & Kiroglu, K. (2016). Improving Astronomy Achievement and Attitude through Astronomy Summer Project: A Design, Implementation and Assessment. *International Journal of Higher Education*, 5(1), 47–61.
- Wyatt, R. J., Koontz, K., Yu, K., Gardiner, N., Connolly, R., & Mcconville, D. (2013). The Worldviews Network: digital planetariums for engaging public audiences in global change issues [Abstract]. *AGU Fall Meeting Abstracts, 2013*, ED21B–06.
- Yu, K., Connolly, R., Gardiner, N., Hamilton, H., Koontz, K., McConville, D., Sickler, J., & Wyatt, R. (2013). The Worldviews Network: Digital Earth for ecological and resilience education. *Proceedings of the 8th International Symposium on Digital Earth*.

## Biographies

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