

# ADVENTURES IN THE DOME TRADE

**Bringing the Beauty of Astronomy to  
Planetarium Audiences through  
Images, Art, Music, and Storytelling**



**LOCH NESS PRODUCTIONS**  
STORYTELLERS OF THE UNIVERSE

by  
**Carolyn Collins Petersen**  
**Mark C. Petersen**

## **ABSTRACT**

The planetarium theater has evolved over the years from a star projector in the center of a round room to a complex, immersive “experience.”

Today’s planetarium presentations range from live lectures to fully produced multimedia products that use well-written scripts, music, art, astro-imaging, animations, and the human voice to create effective and memorable stories.

This poster presents illustrative examples from currently running programs that combine the arts and humanities with science to teach audiences about the beauty of astronomy and astrophysics.

## **THE HUMANITIES AND ARTS IN ASTRONOMY OUTREACH AND EDUCATION**

The humanities and arts deal with human thought and expression through philosophy, history, language arts, literature, fine arts, and music. Every topic of interest to us — including science — can be expressed and discussed using the humanities to “put the human touch” on our understanding and comprehension. Humanities and sciences are not diametrically opposed, but complement each other.

Like other sciences, astronomy deals with observations, identification, description, experimentation, and theoretical explanations of observed phenomena. The words “astronomy” (and “science”) often set up barriers in people’s minds, bringing up issues about the difficulty of the subject. This is unfair because the objects studied by astronomers can evoke awe and wonder. Fortunately, astronomy is often a very visual science, allowing many possibilities for its depiction in literature, art, and music.

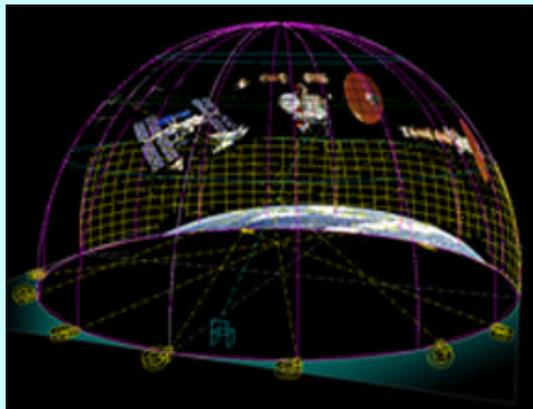
Examples include the influence of astronomy on art in the form of space art paintings and computer-generated visualizations; and on musical compositions, which result in “space” or “ambient” music. Astronomy is often the subject of poetry and literature (in the form of science fiction, for example), as well as description and critical review through history and philosophy.

Art, music, storytelling, history, and astronomy all come together to create effective planetarium presentations that teach astronomy to a wide variety of audiences.

## WHAT IS A PLANETARIUM?

Remember the first planetarium you visited? You might recall a round room with a giant mechanical machine in the middle that projected stars onto a domed ceiling, and you learned how to find constellations. Maybe the instrument was joined by banks of slide projectors that painted the dome with images of celestial objects, panoramic scenes, and dazzling special effects. Or you may remember a place that used video projector systems to take you on a tour of the cosmos.

## SOME FACTS ABOUT PLANETARIUMS IN THE WORLD TODAY



Most are “classic” theaters that use opto-mechanical star machines, auxiliary slide and video projectors, and sound systems.

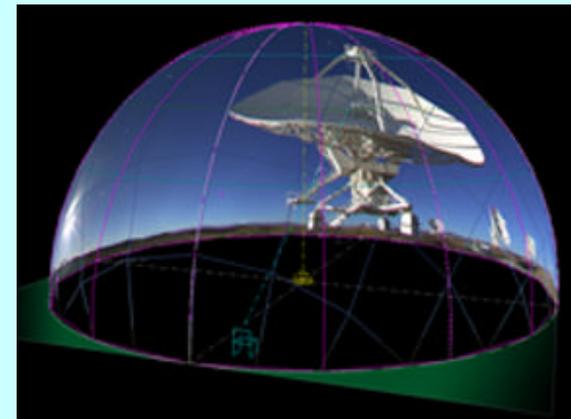
### How Many Are There?

**2,917 theaters**

1,012 in schools  
403 in universities  
421 in museums  
1,000 elsewhere

### Estimated Annual Attendance

93,541,675



About 110 are equipped with new full-dome video projection technology that can project starfields as well.

## WHAT'S A PLANETARIUM SHOW?

The planetarium theater is an immersive environment that gives audiences the “feel” of space and the chance to explore the stars. Planetarium presentations make use of the powerful content of imagery, the interpersonal dynamics of storytelling and the oral tradition, and the evocative moods induced by music. The result should be a consistent, memorable, and positive message about astronomy, astrophysics, and space science to all audiences.

Planetarium professionals present different kinds of programs under the domes. Each form is used according to the needs of the audience and the occasion. We summarize them here under three broad divisions.

The most familiar are live lectures, and star/constellation identification talks (sometimes known as “green arrow shows”). These are usually accompanied by Q&A sessions. Lectures may also include images and video clips, storytelling, oral histories and any other information the presenter wishes to use to teach astronomy.

Another prevalent type of show is the pre-recorded multi-media presentation. Individual images combine with animations and scientific visualizations, all synchronized to a narration and music.

Planetariums also host non-astronomical events: concerts, plays, and laser light shows.

## WHAT'S A PLANETARIUM SHOW?

The remainder of this paper focuses on ***pre-recorded planetarium shows*** — distinctive multi-disciplinary, multimedia presentations about topics in astronomy, astrophysics, space science, planetary science, and cosmology. Like other forms of media (TV documentaries, movies) they require good basic building blocks:

- ◆ Well-written, approachable scientifically accurate narrative/story
- ◆ Clear, understandable narration voice
- ◆ Effective imagery that enhances the storyline and gives the audience a good visual feel for the material being presented
- ◆ Music that sets a mood and conveys the emotional appeal of the material
- ◆ Choreography that allows the audience time to savor and learn

# PIECES AND PARTS: THE ANATOMY OF A PLANETARIUM SHOW

## The Script

The heart of a multimedia planetarium show is the script. It does the factual "heavy lifting." It may be inspired by imagery, or an idea, or a memorable event. The scriptwriter's responsibility is to the audience: to explain images, events, or ideas accurately and entertainingly.

A narrative script is written to be HEARD. While most astronomers are good writers, they are used to working in an academic style more suitable for peer-reviewed journals. A media script requires the wordsmithing and storytelling talents of a science media writer.

At Loch Ness Productions, our shows are written by an experienced science media producer with astronomy research background. We work with a review panel of media-savvy astronomers and astrophysicists to ensure scientific accuracy.

time	visuale	audio	page
0:00	HOUSE lights fade STARS up	[opening music: 30 seconds]	1
0:30	Planetarium Moon and planets	For much of human history, <i>this</i> was all we could see of the universe — a few thousand stars set in the velvet darkness of night... along with the Moon and planets, wandering across the celestial backdrop.	2 3 4 5 6 7 8
0:51		And this is what anyone can see, on a clear, dark night — until we magnify the view...	9 10 11 12
1:01	1. Mars 2. Saturn 3. Neptune	We find desert planets, and gas giant worlds...	13 14 15
1:09	4. 47 Tucanae cluster 5. NGC 1818 cluster 6. NGC 1850 cluster	Stellar families, clustered together...	16 17
1:16	7. Lagoon Nebula 8. Cone Nebula 9. Keyhole Nebula	Starlight nurseries of gas and dust.	18 19
1:23	10. V838 Monocerotis 2004 11. Blinking Eye Nebula 12. NGC 2440 nebula	The death shrouds of stars lie in celestial graveyards.	20 21 22
1:31	13. NGC 4414 galaxy 14. Colliding galaxies 15. Sombrero Galaxy	Galaxies wheel through the universe, playing out a vast drama of cosmic life and death.	23 24 25

# PIECES AND PARTS: THE ANATOMY OF A PLANETARIUM SHOW

## The Visuals

Humans are visually oriented creatures. Fortunately, astronomy routinely delivers stunning imagery that can be adopted into many times of presentations.

Planetarium show producers use a wide variety of visual media that must be adapted to work with the theater's specialized slide and/or video formats.



Astro images (photography, digital realizations, etc.) from observatories and space missions are the main sources of visuals for planetarium shows. But standard releases are often in print-friendly formats which are not conducive to display on the dome.

Animations and video sequences come from a variety of sources, including science visualization specialists, planetarium artists, and producers.



Artwork created specifically for a given show can illustrate facts in text and graphical form.

Space art illustrates scenes for which there are no other images or data available. It's often used to depict events, objects, and processes we can't "see" such as this black hole.



## PIECES AND PARTS: THE ANATOMY OF A PLANETARIUM SHOW

### The Soundtrack

The soundtrack provides the timeline for the entire show, and contains the narration, music, and sound effects. These provide aural cues for the show's visual

#### The Music

Music carries the essential currents of emotion and atmosphere through a show, setting scenes, creating a feeling, opening a listener's mind to new ideas, and forging associations with the story. Perhaps influenced by the movie *2001: A Space Odyssey*, early planetarium shows used classical music. Recently many planetariums have used specially composed space music in their shows. The genre matches the splendor of astronomy images and helps transport the listener to the stars, planets, and galaxies.

The following examples illustrate the kinds of multimedia shows that take advantage of the humanities and fine arts to teach about astronomy.

#### The Narration

The narrator is the voice of the show, an actor playing a part, creating an event whereby knowledge is communicated from you (the scientist) to the audience. S/he is a storyteller, whether the script is a documentary or a first-person narrative.

The voice must sound believable and comfortable with the words of the script because they are teaching the audience about your research and accomplishments.



## EXAMPLE #1: *HUBBLE VISION*

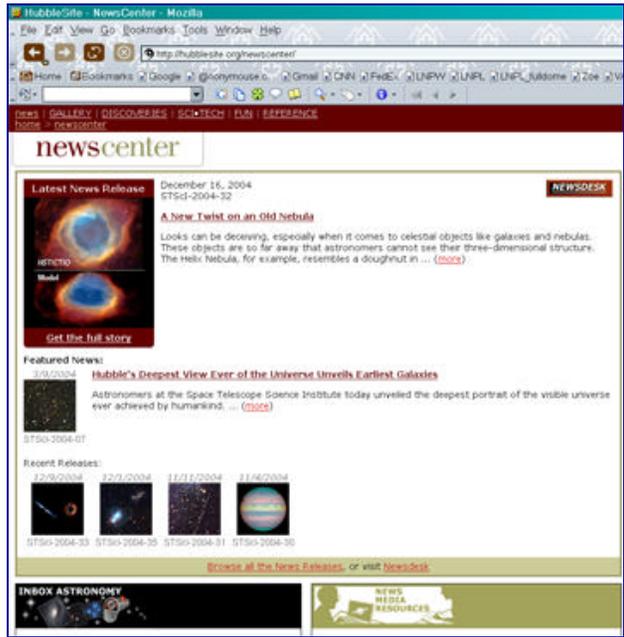
Written by Carolyn and Mark Collins Petersen

Narrated by Wren Ross

Music and soundtrack by Mark C. Petersen

This show is a documentary for general public audiences, and explains HST's accomplishments in planetary science, stellar evolution, galaxy evolution, and cosmology. Visually it presents the best and most representative imagery received from the observatory.

The script reflects a parallel evolution: while almost entirely influenced by the images and visualizations available from the online archives at the Space Telescope Science Institute, we wove a story that gives HST's history and science, and demonstrates the depth and breadth of astronomy research being done with the telescope.



## HUBBLE VISION: IN-DEPTH DISCUSSION

HST has always been a newsmaker and its story is one of continuing fascination for the public. We opted for the documentary approach since that allowed us to switch smoothly during the show between a variety of related topics.

The production process began after the script was finished and vetted, and the visuals were selected. Each image was carefully reframed so that a classic theater's slides would present a consistent image quality throughout the show. We used Adobe Photoshop for image processing, and Adobe After Effects to edit the fulldome video version of the show. The show uses 180+ images from HST, plus several fulldome stills and two video sequences.

The show was double-produced for both classic and fulldome planetarium theater formats. Classic facilities received digital imagery on data CD, and the soundtrack and video clips on a DVD. The planetarian could make 35mm slides from the images, or order them pre-made at an additional cost. A ready-to-play video in "dome master" form was created for the fulldome theaters.

The script was narrated by a professional actor. The voice-over tracks were digitally edited and mixed with original music composed for this program. The resulting soundtrack formed the "timeline" for visual choreography and final production.

Preview files of this show are available at:  
[www.lochness.com/shows/hv2/hv2.html](http://www.lochness.com/shows/hv2/hv2.html)



## EXAMPLE #2: *SKY QUEST*

Written by Carolyn Collins Petersen

Narrated by Roxann Dawson

Music and soundtrack by Mark C. Petersen

**Sky Quest** was created for school-age children and family audiences. It was commissioned by the Albert Einstein Planetarium at the Smithsonian Institution's National Air and Space Museum, Washington, D.C. It is a first-person story told by an astronomer who

reminisces about her childhood interest in astronomy. Along the way she teaches constellation-finding, explores several planets through the use of mission photographs, and talks about light pollution.

Visually, **Sky Quest** combines video sequences with astrophotos and specially commissioned panorama paintings to help set the show's stargazing scenes.

Preview files of this show are available at:  
[www.1ochness.com/shows/sq/sq.html](http://www.1ochness.com/shows/sq/sq.html)





### EXAMPLE #3: THE COWBOY ASTRONOMER

Written by Carolyn Collins Petersen

Narrated by Baxter Black

Music and soundtrack by Mark C. Petersen

students attending the National High School Rodeo Championships in his town. He wanted it to relate to cowboys, have Native American star legends, and show how others view the night sky. The show has both a main narrator and a Native American storyteller. The script is written from the cowboy's first-person point of view. The presentation uses original space art and graphics, astronomy images, and a series of panoramas depicting various western scenes.

The Cowboy Astronomer was commissioned by the Sage Valley Junior High School Planetarium and the Campbell County School District in Gillette, Wyoming.

Preview files of this show are available at:  
[www.lochness.com/shows/tca/tca.html](http://www.lochness.com/shows/tca/tca.html)





## EXAMPLE #4: MARSQUEST

Written by Carolyn Collins Petersen

Narrated by Patrick Stewart

Music and soundtrack by Mark C. Petersen

MarsQuest was produced as part of the Space Science Institute's MarsQuest project. The show combines science, art, history, literature, and our ongoing cultural interest in the Red Planet. We worked with scientists at the Space Science Institute to bring Mars discoveries to the show. The show plays at facilities around the world.

It begins with an incantation of Mars gods names, explores our changing views of Mars throughout history (from war god to planetary exploration target), presents past and current planetary science, gives science-fiction views of the Red Planet, and speculates about future exploration. It ends in a soliloquy by a future colonist pondering humanity's fascination with Mars.

Preview files of this show  
are available at:  
[www.lochness.com/  
shows/mq/mq.html](http://www.lochness.com/shows/mq/mq.html)



## SUMMARY

The arts and humanities, coupled with ongoing astronomy discoveries contribute much to the strength of a planetarium presentation. Creating the types of multimedia shows described here is a complex undertaking, requiring the coordination of scriptwriter/researcher, science review panels, visual artists/suppliers, video and animation creators, soundtrack artist/composer, narrator, and show choreographer.

The result is can be a very effective, memorable, and touching piece of “science media.”

Planetarium professionals in theaters and at production companies routinely create these presentations for their audiences. They can represent excellent outlets for scientists who want to communicate their science to the public through illustrated lectures or multimedia productions.

## FOR MORE INFORMATION:

For a copy of this paper,  
and more specifics about the creation of planetarium shows,  
peruse the Planetarium Reference Library at:

[www.lochness.com/pltref/pltref.html](http://www.lochness.com/pltref/pltref.html)

## ABOUT THE AUTHORS:

Carolyn Collins Petersen is vice-president of Loch Ness Productions, and a long-time member of the AAS. She has written and edited six books, 25 documentary scripts, and countless magazine articles on astronomy topics. She was an editor at Sky Publishing Corporation from 1997-2000, and worked for eight years as a comet researcher and research associate at the University of Colorado Laboratory Atmospheric and Space Physics.



Mark C. Petersen is president of Loch Ness Productions. He has produced more than 30 planetarium shows, released seven albums of space music, and currently maintains The LNP Planetarium Compendium, a database of planetaria worldwide.