The revolutionary power of Digistar 4 is now portable. The new Digistar Outreach uses a single DLP video projector with a fisheye lens, bringing uncompromising big screen planetarium experiences to inflatable domes. From a simple iPad interface, you can harness the power of Digistar to reach out to your community in ways you never thought possible.

Gillette Wyoming is in the heart of America’s new energy future. Surrounded by coal, natural gas, and oil reserves, as well as plentiful wind power, it sends out energy resources to the rest of the country. And it will soon be sending out astronomy education resources as well. The Campbell County School District Planetarium in Gillette is the first American CHRONOS II HYBRID installation. Its director, Paul Zeleski not only has an ambitious goal of creating HYBRID planetarium programs for others’ use, but also of producing students who are proficient in the production skills which will be used in tomorrow’s world.

This project to put students in the planetarium driver’s seat began with a total renovation to the district’s 30-year old planetarium equipment. In addition to the CHRONOS II HYBRID with SP2-HD video projection, full audio, lighting, and even laser light show equipment was put under a brand new dome. 68 new custom-made seats now fit under the 9 meter diameter dome.

The next step in the equipment upgrades will add 68 touchscreen devices at each armrest, where students may be quizzed by the instructor, scan and search for more information about topics on the dome, and with specially-created software even enable them to control the sky from their own seats. GOTO CHRONOS II HYBRID and the rest of the technology and integrated software programs at Gillette have set a new standard for modern educational planetariums. This planetarium will both inspire and educate. At Gillette, not even the sky is the limit!

To learn more, contact:

**GOTO INC**
4-16 Yazaki-cho, Fuchu-shi, Tokyo 183-8550 Japan
Tel: +81-42-362-5312
Fax: +81-42-361-6571
E-Mail: info2@goto.co.jp
URL: http://www.goto.co.jp

**GOTO LIAISON**
346 Ilimano St., Kailua, HI 96734
Toll-Free from USA: 888-847-5800
International: 808-254-1888
E-Mail: gotousa@earthlink.net
Contact: Ken Miller

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Standing Committees

Awards Committee
Prof. Lars Broman, Chair
Teknoland
Stärgtjärnsväg 132
SE-791 74 Falun
Sweden
+46 2310177
Lbr@teknoland.se
www.teknoland.se

Conference Committee
Dave Weinrich
Planetarium
Minnesota State
University-Moorhead
1104 7th Avenue South
Moorhead
Minnesota 56563 USA
1104 7th Avenue South
University-Moorhead
Minnesota State
Planetarium
Dave Weinrich
Conference Committee
Lbr@teknoland.se
+46 2310177
Sweden
SE-791 74 Falun
Stångtjärnsv 132
Teknoland
Prof. Lars Broman, Chair
Awards Committee

Finance Committee
President, Past President, President Elect, Treasurer, Secretary

Membership Committee
Shawn Laatsch, Chair
‘Imiloa Astronomy Center of Hawaii
600 ‘Imiloa Place
Hilo, Hawaii 96720 USA
+1 808-969-9735
+1 808-969-9748 fax
slaatsh@imiloahawaii.org

Elections Committee
Martin George, Chair
Launceston Planetarium
Queen Victoria Museum
Wellington Street
Launceston Tasmania 7250
Australia
+61 6323 3777
+61 6323 3776 fax
Martin.George@qvmag.tas.gov.au

Outreach Committee
Jon W. Elvert, Chair
Irene W. Pennington Planetarium
Louisiana Art & Science Museum
100 South River Road
Baton Rouge, Louisiana 70802
USA
+1 225-344-5272
+1 225-214-4027 fax
jelvert@lasm.org

Conference Host-2014
Dr. Jin Zhu, Director
Beijing Planetarium
138 Xizhimenwai Street
Beijing 100044 China
+86 10-5158-3007
+86 10-5158-3312 fax
jinzhul@bjp.org.cn

Conference Host-2012
Jon Elvert
Irene W. Pennington Planetarium
Louisiana Art & Science Museum
100 South River Road
Baton Rouge, Louisiana 70802
USA
+1 225-344-5272
+1 225-214-4027 fax
jelvert@lasm.org

Ad Hoc Committees

Education Committee
Jack L. Northrup
Dr. Martin Luther King, Jr. Planetarium
King Science and Technology Magnet Center
3720 Florence Blvd.
Omaha, NE 68110 USA
+1 402-557-4494
jnorthrup@fbx.com
webmail.ops.org/~jack.northrup

Full-Dome Video Committee
Antonio Pedrosa, Chair
Navegar Foundation
Centro Multiméios Espinho
Av. 24, nº800, 4500-202 Espinho
Portugal
+351 22 7331191
+351 22 7331191 fax
apedrosa@multimeios.pt

History Committee
John Hare, IPS Historian
Ash Enterprises
3602 23rd Avenue West
Bradenton, Florida 34205 USA
+1 941-746-3522
johnhare@earthlink.net

International Relations Committee
Martin George, Chair
Launceston Planetarium
Queen Victoria Museum
Wellington Street
Launceston Tasmania 7250
Australia
+61 6323 3777
+61 6323 3776 fax
Martin.George@qvmag.tas.gov.au

Outreach Committee
Jon W. Elvert, Chair
Irene W. Pennington Planetarium
Louisiana Art & Science Museum
100 South River Road
Baton Rouge, Louisiana 70802
USA
+1 225-344-5272
+1 225-214-4027 fax
jelvert@lasm.org

Portable Planetarium Committee
Susan Reynolds Button, Chair
Quarks to Clusters
8793 Horseshoe Lane
Chittenango, NY 13037
+1 315-687-5371
sbuttonq2c@twcny.rr.com
sbuttonq2c@att.net

International
Relations Committee
Martin George, Chair
Launceston Planetarium
Queen Victoria Museum
Wellington Street
Launceston, Tasmania 7250
Australia
+61 6323 3777
+61 6323 3776 fax
Martin.George@qvmag.tas.gov.au

Outreach Committee
Jon W. Elvert, Chair
Irene W. Pennington Planetarium
Louisiana Art & Science Museum
100 South River Road
Baton Rouge, Louisiana 70802
USA
+1 225-344-5272
+1 225-214-4027 fax
jelvert@lasm.org

Portable Planetarium Committee
Susan Reynolds Button, Chair
Quarks to Clusters
8793 Horseshoe Lane
Chittenango, NY 13037
+1 315-687-5371
sbuttonq2c@twcny.rr.com
sbuttonq2c@att.net

Finance Committee
President, Past President, President Elect, Treasurer, Secretary

Membership Committee
Shawn Laatsch, Chair
‘Imiloa Astronomy Center of Hawaii
600 ‘Imiloa Place
Hilo, Hawaii 96720 USA
+1 808-969-9735
+1 808-969-9748 fax
slaatsh@imiloahawaii.org

Elections Committee
Martin George, Chair
Launceston Planetarium
Queen Victoria Museum
Wellington Street
Launceston Tasmania 7250
Australia
+61 6323 3777
+61 6323 3776 fax
Martin.George@qvmag.tas.gov.au

Outreach Committee
Jon W. Elvert, Chair
Irene W. Pennington Planetarium
Louisiana Art & Science Museum
100 South River Road
Baton Rouge, Louisiana 70802
USA
+1 225-344-5272
+1 225-214-4027 fax
jelvert@lasm.org

Portable Planetarium Committee
Susan Reynolds Button, Chair
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8793 Horseshoe Lane
Chittenango, NY 13037
+1 315-687-5371
sbuttonq2c@twcny.rr.com
sbuttonq2c@att.net

Ad Hoc Committees

International Relations Committee
Martin George, Chair
Launceston Planetarium
Queen Victoria Museum
Wellington Street
Launceston, Tasmania 7250
Australia
+61 6323 3777
+61 6323 3776 fax
Martin.George@qvmag.tas.gov.au

Outreach Committee
Jon W. Elvert, Chair
Irene W. Pennington Planetarium
Louisiana Art & Science Museum
100 South River Road
Baton Rouge, Louisiana 70802
USA
+1 225-344-5272
+1 225-214-4027 fax
jelvert@lasm.org

Portable Planetarium Committee
Susan Reynolds Button, Chair
Quarks to Clusters
8793 Horseshoe Lane
Chittenango, NY 13037
+1 315-687-5371
sbuttonq2c@twcny.rr.com
sbuttonq2c@att.net

Armand Spitz
Planetarium Education Fund
Finance Committee

Technology Committee
Jack Dunn
Ralph Mueller Planetarium
University of Nebraska-Lincoln
210 Morrill Hall
Lincoln, Nebraska 68588-0375 USA
+1 402-472-2641
+1 402-473-8899 fax
jdunn@spacelaser.com
www.spacelaser.com/gppa

Web Committee
Alan Gould, Chair
Holt Planetarium
Lawrence Hall of Science
University of California Berkeley, California
94720-5200 USA
+1 510-643-5082
+1 510-642-1055 fax
adgould@comcast.net

IPS Permanent Mailing Address
International Planetarium Society
c/o Shawn Laatsch
Treasurer/Membership Chair
All fiscal business:
P.O. Box 4451
Hilo, Hawaii 96720 USA
All other correspondence:
‘Imiloa Astronomy Center of Hawai’i
600 ‘Imiloa Place
Hilo, Hawaii 96720 USA
+1 808-969-9735
+1 808-969-9748 fax
slaatsh@imiloahawaii.org

IPS Web Site:
www.ips-planetarium.org

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Behind the scenes

The deadline for this issue fell on a strange conjunction of events going on around me. We’re remodeling our bathroom, so I edited while construction was going on above me. The bathroom crew was polite, very competent, cleaned up after themselves, and finished the job sooner than expected. They also clearly explained what they were doing.

I wish I could say the same when it came to purchasing new hardware. Every time we stepped into the “big box” stores to look at flooring, sinks, lights and more, I cursed the loss of Stambaugh-Thompson’s, the long-time local hardware store that closed (you guessed it) after the big box stores moved in.

Stambaugh’s was staffed by experienced people who knew their stuff and would bend over backwards to help you. The big box stores, not so much. You’re more likely to get blank looks than help.

When I find the time to take the dog on her walks, I’m listing to Rachel Carson’s Silent Spring. This year is the 50th anniversary of this world-famous book that opened eyes to the damage we were doing to our planet.

In discussing the fact that we knew we were doing harm, she writes

_Have we fallen into a mesmerized state that makes us accept as inevitable that which is inferior or detrimental, as though having lost the will or the vision to demand that which is good?_

Aren’t we doing the same thing today, when we accept less than adequate service from the big box stores, the fast food restaurants, the big department stores, and even from offices within our own sites? Some days I have a harder time dealing with offices at my university than I do with the first graders who come to the planetarium.

The difference between mediocre service and excellent service—between the lackluster employees of the big box stores and university office and the caring employees of my bath remodelers and Stambaugh’s—is people.

Not just personality types and knowledge, but people who are given the responsibility to make decisions and have those decisions supported by their superiors. In today’s corporate world, employees are seen as assets. Wikipedia says that “assets are economic resources. Any-
TAKE A CLOSER LOOK

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The Importance of Being Human

One of my favorite plays is Oscar Wilde’s *The Importance of Being Earnest*. It is a clever story with crisp dialogue and a moral that illustrates the meaning of being true to one’s identity. It has some relevance to a planetarium medium that is searching for its identity in this world of fulldome digital systems.

This essay is about exploring that identity. At the end of this declaration, I shall reveal a foolproof formula for making every planetarium successful. However, before you skip to the end, I respectfully ask that you indulge this writer and consider the following.

Every great teacher you ever knew helped you, or at the very least, allowed you, to love learning. They themselves were lovers of learning. They were passionate about their subjects, and their excitement was infectious. You succumbed to an incurable disease of subjects, and their excitement was infectious. You succumbed to an incurable disease of wanting to know more. These rare and wonderful teachers took you beyond textbooks and rote learning. They taught you that learning wasn’t something that stopped at the end of the school day. It was alive in books, libraries, museums, science centers, historic sites, nature trails, and yes, even in planetariums.

What happened on the way?

Something horrible happened on the way to the 21st century. We, as educators and purveyors of the wonders of the universe, seem to have forgotten our primary mission. Somehow we have strayed into thinking that our job was to merely get students to master a group of skill sets, to pass a series of tests, and to meet some arbitrary standards of education.

In the process, we may have managed to kill all love of learning. We forgot our primary purpose: to make our students and our public visitors life-long learners—to develop people young and old who are in a constant state of knowledge growth and not in an endgame of test and subject achievement followed by academic amnesia.

... by some estimates individuals spend as little as 9 percent of their lives in schools. Furthermore, science in K-12 schools is often marginalized by traditional emphases on mathematics and literacy; hence little science is actually taught during school hours.

Excerpt from *Surrounded by Science: Learning Science in Informal Environments* by Marilyn Fenchel and Heidi A. Schweingruber; National Research Council (2010).

Planetariums in general, and those in particular associated with public museums and science centers, are active participants in the other 91% of an individual’s life. Over a human lifespan, one is likely to learn much more science from informal education sources such as museums, libraries, documentaries, and the internet than in the formal education setting of the classroom. I would argue that museums, zoos, and planetariums are far more significant educators long-term.

These informal educational institutions should not be trapped in a sticky gel of state-mandated test standards for classrooms to justify school field trips or funding support. Having served on a state educational standards committee, I can tell you that not one of the adopted science goals and objectives for K-12 students required a planetarium. It is virtually the same in every state.

If it is mandated by a state standard that there are to be no astronomy concepts taught in a specific grade level, then the teacher has an uphill battle to justify a field trip to the planetarium. I would argue that precisely because there is no astronomy taught at that grade level, the teacher and principal are morally obligated to take their students to the planetarium and teach them that there are other significant ways of learning.

I can’t tell you how many times I see planetarium programs that are really lessons that could be taught just as well, if not better, in a classroom. When I talk to superintendents trying to determine whether they should close or re-invest in their planetariums, they almost always ask why should they support such an expensive “classroom” upgrade when computer desktop planetariums and videos do as good a job helping them meet state standards? I reply: “That is exactly why you invest in them, because one of the unique purposes of a planetarium is to teach or illustrate those concepts that are difficult, if not impossible, to teach or illustrate in a classroom or on a desktop computer.”

What is our purpose?

Our collective planetarium purpose is to educationally lead our communities, not follow. It is time for planetariums to be earnest and to embrace their true mission of inspiring and instilling wonder and awe, to provoke their public audiences to look beyond their classrooms, to recognize the role of informal education, and to see first-hand an amazing and mysterious universe. Those planetariums that are taking this not-so-politically-correct path are succeeding. Their bravery is rewarded and is an important key to being a successful planetarium.

There are other keys. Those of us who were in charge of planetariums associated with museums were often called “planetarium curators,” a strange word meaning “keeper” or “caretaker.” I always found it difficult to understand how I could be the ‘keeper’ of the universe or the “caretaker” of the sun, moon and stars in a cosmos where I am just lucky enough to be here.

This word has evolved to also mean “interpreter” of objects and collections. For the planetarium, the objects are the sun, moon and stars and the universe is the ultimate collection.

In the fullness of time, I realized that the role of the planetarium was to celebrate the universe with as much passion and love of knowledge as possible and to help our visitors interpret what they see in the sky. I think this is the role of people who teach in and produce for planetariums. We are not just curators of the planetariums or the stars they represent, but rather, nurturers of the human desire of our students and visitors to know more.

Our amazing revolution

Planetariums have gone through an amazing revolution with the advent of fulldome digital planetarium projection systems. For the first time, we have a presentation media with some standardization. We have the ability to show anything we can imagine and the talent and financial resources to create. Now a program produced for a 20-meter dome and designed to play back on a multi-million dollar system can play back flawlessly on a 6-meter dome on a system that costs less than $100,000. This should be the “golden age” or the “renaissance” of planetariums. We have more in common with Imax® theaters that for decades we resented or only secretly admired. It is a perfect example of “be careful what you wish for.”

Today many planetariums have converted to fulldome digital technology and are faced with much higher costs of operation, particularly for pre-rendered shows. The days of getting a program for $250 are long gone. Now, even the smallest planetarium must have a tenfold increase in show budgets. Most don’t have the funds to produce their own unique fulldome extravaganzas and must depend on the works of other larger, better-funded institutions or dedicated independent producers.

Today there is very little difference between these digital planetariums. For the most part, they tend to present the same pre-rendered content. Each facility is haunted by the question: Once we burn through our library...
Controversies precede advances?

We have always had our planetarium controversies. Some, in retrospect, may seem silly. In the 1950s, it was the audacity of adding music to our "lectures." In the 1960s, it was slides, 16mm film, and special effects. In the 1970s, it was pre-recorded narration or "canned" versus "live" programs and the use of automation. In the 1980s, it was computer animation and video. And in the 1990s, it was the rise of full-dome digital planetariums versus the sky quality of optical-mechanical projectors.

In spite of the controversies, each of these "advances" offered the potential to make us better storytellers. Fast-forward to today, and many planetariums have much more in common with movie theaters than planetariums of the past. Sadly, some of these facilities have become a movie-push-a-button-planetarium with little soul and even less personality.

Please don’t misunderstand me here. There are wonderful full-dome programs that have a great script, narration and music score wrapped in stunning visualizations. However, what marks a great full-dome show is the unique passion and viewpoint it brings to the audience. For instance, Robin Sip of Mirage3D has transformed his love of science and storytelling into some amazing full-dome productions. I am emotionally moved when I see a Robin Sip show or hear a Carolyn Collins Petersen script because they communicate at a very human level and are on an earnest quest to enlarge our view of the universe. They share their "personal" and unique perspective through a very impersonal digital medium. That is not easy.

One notable experiment in making these full-dome programs more human is at the Griffith Observatory in Los Angeles. Here live actors in synchronization with the visualizations and music speak a story of the history of humankind’s exploration of the universe. I have seen the same show twice, once with a female actor and the other with a male actor. Judging from my own reaction and the reactions of the audience, I’d say all of us paid more attention to this more personal approach. The actors smiled, looked you in the eye, and used props to add even more visual realism.

My only disappointment is that the actors had to stay with the script and could not deviate. That meant they couldn’t react to a laugh or a nod of understanding or take a path that might have been more relevant. That is where the presentation stopped being human. It made me realize that it might be better to give astronomy lecturers acting lessons on how to speak poetically and passionately about a subject rather than use actors to parrot a well-worn script. Regardless, the Griffith should be seen by every planetarian. It is a brave and bold experiment that holds lessons for all of us.

So where do we go from here? How do we use these new digital tools with our limited program budgets? Well, fortunately, there are many shining examples around us. The Tel-lus Science Museum’s Planetarium in Northwest Georgia, under the leadership of David Dundee, has elected not to simply be a digital movie theater. David has over 30 trained show-runners and operates 8 hours a day, 7 days a week, 12 months a year. His 120-seat theater has averaged more than 100,000 paid admissions per year over the last three years.

The human secret to success

The secret to this planetarium’s success is David’s philosophy that every visitor shall receive a live (human) guided tour of the night sky before each full-dome movie presentation. These are quality educational and entertaining presentations that allow the planetarium to meet the expectations of its audience. Every show is different and worth seeing. This show philosophy is also part of other successful planetariums, such as Nashville’s Sudekum Planetarium.

A long time ago, Jack Horkheimer gave me some advice. “Always have a section in your programs that just shows the stars.” Yes, we all want to create visual extravaganzas; however, the audience will always feel cheated if we simply don’t take the time to show them the stars.” Jack was right then, and he still is now.

One possible solution to under-funded planetarium budgets is to not depend solely on purchasing expensive pre-rendered content. Live shows presented with passion by knowledgeable humans using all of the capabilities of digital planetariums will sell as well as most pre-rendered programs. Combined with fulldome movies, you have the best of both worlds and a way to extend the life of these movies in your theater.

Be a planetarium

So my friends, here it is, the secret of the universe, planetariums and everything:

Be earnest and true to yourselves—be a planetarium, and, most important of all, be unafraid to be human by sharing your love of the sun, moon and stars.

You don’t need a million-dollar budget or even a thousand-dollar budget to do that. It doesn’t matter what technology you use or what size dome you project upon. If you can approach your presentations with same awe and wonder you had when you saw your first star-filled sky, you will succeed. For what our audiences want the most is a learned and passionate guide to the heavens. They want someone with a cosmic perspective who will inspire them to go find their own starry night, explore it and, yes, celebrate it. Nothing could be more human and, for planetariums, more important.
Dear Friends and Fellow Planetarians

This year brings us to our twenty-first biennial conference. In the first issue of the *Planetary* (June 1972), President Paul Engle admonished members to “make the first meeting of ISPEI in San Francisco a truly outstanding and memorable event.” Every two years since that first conference, successive conferences have continued that tradition.

I have no doubt that this year’s conference in Baton Rouge will be another outstanding and memorable event. Conference host Jon Elvert, director of the Irene Pennington Planetarium, has emphasized that the conference theme, Bridge to New Beginnings, “will embrace our profession’s desire to bridge diversity among our domes, to reach over to potential venues by bringing in related industries worldwide, to bridge alliances between our domes and technologies, and to provide a virtual bridge, connecting non-attending members to online conference sessions.”

Members who may not be able to attend the conference personally will still be able to have a virtual presence at the opening ceremony, the business meeting, and the paper sessions. By this time you should have received details of the conference in the mail. You may also check the IPS website for a link to the conference website.

**Meeting with friends in Brazil**

I was invited to attend the annual meeting of the Association of Brazilian Planetariums this past November. The conference was quite unique in that it was held in two cities separated by 194 km (121 miles).

After gathering in Fortaleza, the entire group traveled by bus to Sobral for the first part of the conference. A new planetarium is being constructed in Sobral near the Museum of the Eclipse, which is located at the site of the astronomical observations of the 1919 solar eclipse which confirmed Einstein’s theory of general relativity.

We had a welcoming ceremony and a day of papers and educational presentations before traveling back to Fortaleza for the final two days of the conference. Paper and poster sessions continued and a public lecture by a famous Brazilian astronomer and a business meeting were also held.

A number of local high school students were invited to the conference. I enjoyed meeting some of them and hearing their plans for astronomy-related careers.

Planetarians are an innovative group. During the conference I had the opportunity to visit with Amauri Pereira, who has developed his own “homemade” lens to convert a video projector into a full-dome planetarium system. He hopes to use his system to bring inexpensive digital planetariums to Brazil and other countries.

**Officers meet in Northern Ireland**

In early January, the IPS officers gathered at the Armagh Planetarium in Northern Ireland, United Kingdom for an officers’ meeting, hosted by Past-President Tom Mason. Most of our IPS business is conducted by email and occasional Skype sessions, but we also find it very valuable to get together for face-to-face meetings. We try to schedule an officers’ meeting once a year.

This year we spent time discussing the upcoming conference, possible conference sites for 2016, the IPS website, and other business. We are especially excited to announce a new IPS website. This update will greatly enhance the functionality of our website. Some of the changes will include the opportunity for members to update their membership records directly, built in social media for groups and committees, and a very easy to use content management system.

At the end of my last President’s Message I discussed the state of IPS in 2011 compared to the state of IPS that President Dale Smith’s Message wrote about in the December 2000 *Planetary*.

At the turn of the millennium, there were only six planetariums spread across the vast expanse of sub-Saharan Africa and there was no reason to even speculate about an African affiliate. Two of the six planetariums listed in 2000 no longer exist, but the number of African planetariums is increasing and includes several portable domes. Perhaps in the future, we will have an African affiliate.

The planetarium community has changed in ways that we probably didn’t anticipate in 2000. Who could have predicted the large number of digital systems that are found in many fixed and portable planetariums today? The digital world presents many opportunities and challenges. Do we still call our theaters planetariums? What is a planetarium?

(Continues on Page 20)

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1 The ISPE, the International Society of Planetarium Educators, was the forerunner of the International Planetarium Society.
Join a family of aliens searching for the perfect vacation spot in the solar system. Available February 20.

Contact Mike Murray at mmurray@slco.org
385-468-1237 • clarkplanetarium.org/distribution
The 2012 transit of Venus brings new opportunities for the planetarium community to lead the public in astronomy exploration. While the rare alignment of Earth, Venus, and the sun is historically significant, we continue to value the transit method for its leading-edge science, specifically now for revealing new planets around distant stars.

Plan now to quench the thirst of an eager public who wants to experience this last transit of Venus in our lifetimes.

**The second of a pair**

Transits come in pairs that are eight years apart, separated by a span of 105.5 or 121.5 years. While suggestive artifacts hint at sightings in ancient times, in the era of the telescope the first recorded observation came from Jeremiah Horrocks and his friend, William Crabtree. Horrocks first predicted, then safely projected and observed Venus cross the sun in 1639 during the last 30 minutes of a Sunday.

Stripped of the glare in which it was usually enveloped, Venus in silhouette stood out starkly as a well-defined circle. From that first sighting, Horrocks must have mused like ensuing witnesses, “That’s it? It’s just a dot—smaller than I expected.”

True, the planet is small against the monstrous sun. At 1/32nd the sun’s diameter, Venus is only about an arcminute across, which is near the visibility limit of the human eye. Rather than bemoan the diminutive size of the planet—indeed, nearly the size of Earth—one should exalt the enormousness of the sun behind it. Over a million of those black planetary spheres would fit inside the sun.

Edmond Halley realized (and did the math to show) that one could determine the distance from the sun to the Earth, the Astronomical Unit (AU), if observers timed the duration of the transit from known locations around the world. He exhorted his astronomy colleagues to rise to the occasion when the 18th century pair of transits came around.

Like seeing the return of his famed namesake comet, observing the transit of Venus would elude Halley, but his call for a global quest struck a chord and was carried out 20 years after his death.

For the 1761 and 1769 transits of Venus, hopes were high as nations sent a fleet of observers to remote destinations. Halley’s vision of accuracy, however, was hindered by the “black drop” effect. (See accompanying story.)

A new century brought the new tool of photography, and in 1874 and 1882 intrepid astronomers again set out on a global quest to quantify accurately the elusive distance to the sun. The relevance of the transit of Venus as a method for determining the AU was on the wane, however, as other avenues, like asteroid occultations, gained favor.

**Twinkle, twinkle, Kepler star**

New techniques would seem to make the transit of Venus an historical artifact for serious-minded scientists, but for the 21st century planetarium and others, it retains utility.

With the AU issue resolved, a modern question that attracts the attention of astronomers and the public alike is whether Earth-like planets capable of harboring life exist. With the 2012 transit of Venus, we can enjoy a live, close-up view of this revealing alignment as it demonstrates how we’re looking for life elsewhere.

The Kepler spacecraft is peering at about 150,000 stars simultaneously, seeking telltale dips in brightness to indicate planets are crossing their faces. It’s like looking down from a skyscraper and trying to discern a periodic dimming in the streetlights that are a few miles away when flying gnats repeatedly encircle the lights.

In December 2011 the Kepler team an-
nounced detection of the first sun-like star with a planet in the habitable zone, that area where a surface temperature of about 72 F/22 C degrees would allow potential water to be the wet and sloshing type. Suddenly the life-elsewhere notion gets more traction in the realm of possibilities.

The Kepler spacecraft is a transit-lover’s dream. Although transits can be detected only in edge-on systems, there are thousands of stars to sample and potentially hundreds of systems that aligned to the craft. While we marvel at our humble transit of Venus during its six-plus hour sojourn across the sun, the Kepler spacecraft will concurrently track more than one hundred suspected exoplanets at some point in their respective transits.

For anyone who is in the dark, literally, during the transit of Venus, you can try to target those parallel star systems in your telescope. Refer to Sten Odenwald’s Space Math page at spacemath.gsfc.nasa.gov/Transit2012.html.

Joining the legions of earthbound telescopes participating in the transit of Venus, the Hubble Space Telescope will apply local lessons to distant stars. Just two days prior to the transit is a total lunar eclipse, so the waning gibbous moon will still be fairly in line with the Earth-Venus-sun line up. Hubble will be aimed at the moon like a giant photometer so astronomers can measure the decrease in sunlight reflected off the moon.

And, if you thought the penumbra during a lunar eclipse was hard to see, imagine this: Hubble will also use a spectrometer to “sniff” the chemical composition of Venus’ atmosphere. If you happen to see a fat moon mid-transit, realize some of that moonlight may have been strained through our neighboring planet’s clouds.

On the dome

On his own time, Patrick McPike, multimedia artist and technical director at the Adler Planetarium in Chicago, Illinois, has crafted a short Transit of Venus trailer to be viewed either on a flat-screen or in a full-dome format for digital theaters. “I’m working to get people excited and interested in the upcoming transit of Venus,” McPike said.

“More effort should be put into informing the public about interesting astronomy and science related activities that they can participate in. To me, it is just as exciting knowing that something I created inspired someone to go out and take part.”

The 4-minute micro-show, which introduces the role of transits in our quest to understand our place in the cosmos, is available for free download, with details at www.transitofvenus.org/planetarian.

It also features the song “Morning Star” by the band Transit of Venus out of New Zealand.

I invite you to show the free trailer, with or without narration written by this author, to all of your audiences as a bonus to your regular programming.

As of this writing, there are a few commercial planetarium programs that feature exoplanets, such as Extreme Planets by Clark Planetarium Productions and Undiscovered Worlds.

The date of the 2012 transit of Venus depends on your location. For example, for North American observers it occurs on Tuesday, June 5, whereas for Australian observers, all six-plus hours unfold on Wednesday, June 6. Observers at a small northern patch around Iceland will see the transit begin, the sun set, the sun rise, and then the transit end.

Beware that some astronomical tables list the transit as being on June 6, for the naming convention is to title a celestial phenomenon according to the Universal Time of mid-event. If you live in the Americas and you waited until June 6, you’d miss it.

Image courtesy Fred Espenak, NASA/GSFC
**The Search Beyond Our Sun** from the Boston Museum of Science. Both include the transit method.

Bays Mountain Planetarium is working on a transit-specific program called *When Venus Transits the Sun*; see page 64 for more details.

There may be more programs in the works; apologies if I have missed mentioning them.

The Kepler mission, through the Lawrence Hall of Science Planetarium, has been distributing the show *Strange Planets*, with script and media (still images, movies, animations, music) available for free download.

See the article “Share the Hunt for Other Earths” in the March 2009 issue of *Planetarian*, written by Alan Gould, Toshi Komatsu, Edna DeVore, David Koch, and Pamela Harman, for details about the Kepler mission and the show.

This author and planetarian Art Klinger produced the *Transit of Venus* program for the 2004 event with support from the Great Lakes Planetarium Association.

Intended for small venues, it features on DVD a video that is segmented into two dozen chapters so the user can grab the pertinent content. An accompanying CD has individual images, audio, and animations. Made specifically for the 2004 transit of Venus, some of the text is dated and references that year’s celestial alignment.

**Rallying the public**

Since the transit is a sun-gazing event that requires addressing safety concerns, planetariums have a front line role in guiding the public.

If you provide telescopes or other equipment for viewing the transit, you will encounter a bottleneck for time at the eyepiece around the four benchmark moments—from the start of the celestial event at first contact through the all-important second contact, then again at the third contact through the end of the event at fourth contact.

To alleviate the crowding at the critical times, I encourage you to build a Sun Funnel, which allows multiple people to view the sun’s projection concurrently without encountering the path of intense sunlight. If you keep a Sun Funnel on a scope next to you, the public can view the transit of Venus continuously while you gaze into your own scope’s eyepiece to time the internal contact.

Instructions written by Richard Feinberg for making a Sun Funnel are available on the Transit of Venus website under the Eye Safety tab, as are other suggestions for safe viewing methods. A workshop for building Sun Funnels is scheduled at the MAPS conference in Toms River, New Jersey, May 16-19, 2012.

Doug Duncan, director of the Fiske Planetarium in Boulder, Colorado, encourages planetariums to build fundraisers around the distribution of viewing aids. For one solar event he got a local newspaper to put 600,000 solar shades* in the Sunday paper. Another museum, he writes, “bought advertising which was printed on the cardboard temples of the glasses. The paper made money, the museum got a big boost in attendance. Their ad said to bring in the glasses for a discount on admission.”

Duncan has a sample letter posted for others to tailor to their respective community newspapers as well as fundraising suggestions. See casa.colorado.edu/%7Edduncan/wp/?page_id=454.

The transit of Venus is a great opportunity to haul out all of those low-grade telescopes that have languished in people’s homes for years. Because gathering light is a non-issue, and because the sun is easy to find even with a poor mount, anything that magnifies sunlight safely can be pressed into service. Obviously, the only caveat is that all properly filter the sun.

**What if it’s cloudy?**

A transit of Venus experience should not rely on actually seeing the sun on June 5 or 6. I encourage planetariums to coordinate enough related attractions to overcome any weather- or geography-induced disappointment.

For example, in my community there will be an art exhibit, a small collection of historical artifacts, a lecture series, an orchestral performance of John Philip Sousa’s *Transit of Venus March*, planetarium mini-lessons, in-school activities, and telescope observing during the transit.

If that sounds too complicated, as least be

(Continues on Page 14)
Is Earth unique in the universe? How many Earth-size planets exist? Are exoplanetary systems common, and what are they like? NASA’s Kepler Mission seeks to answer these questions by searching for exoplanets, especially Earth-size planets, orbiting in the habitable zone of Sun-size stars.

Launched in 2009, the Kepler spacecraft is a specialized, wide-field telescope equipped with an extremely sensitive 96-megapixel photometer. By precisely measuring changes in a star’s brightness, the Kepler team discovers planets as they cross in front of their stars. This is the “transit method” for detecting planets.

It stares continuously at more than 150,000 stars so it won’t miss a transit. From the transit data, scientists can determine the size of the planet, the length of its year, and calculate the planet’s distance from its star. Combined with Earth-based observations of radial velocity for some planet candidates, the planet’s mass, density and possible surface temperature can be determined.

In some of the multi-planet systems, astronomers observe that the orbital periods vary as the planets interact gravitationally. This is the same sort of orbital variation observed for Uranus that led to the discovery of Neptune. From this analysis, the mass of the planets can be determined.

As of December, 2011, the Kepler team announced 2,326 planet candidates transiting 1,792 stars.

**Kepler and the transit of Venus**

The Kepler Mission is named for Johannes Kepler (1571 -1630), who is often honored as the first astrophysicist. A German astronomer and mathematician, his laws of planetary motion were key discoveries in establishing modern science.

Laws I and II show that planetary orbits are elliptical and that the orbital speed of a planet varies according to its distance from the sun. Law III states that the average distance (semi-major axis) of a planet from the sun can be calculated from the planet’s year-length.

Today, Kepler mission scientists still use Law III to determine the semi-major axis for each exoplanet from its repeated transits.

In 1627, Kepler published the Rudolphine Tables, a star catalog and tables of planetary positions, and first predicted the transits of Mercury (1631) and Venus (1639).

Johannes did not live to see the transits, but others did. Today, the Kepler Mission uses transits to discover planets circling distant suns. Surely, Johannes Kepler would be pleased and amazed.

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**Website references**

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<td>Lessons and Activities: learn and have fun</td>
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<td>Twitter: get official Kepler Mission tweets</td>
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Transit of Venus: “Shadows of the Sun”

There’s an app for that

Each century the transit of Venus came along, scientists brought new tools—from telescopes to photography to satellites—to the task of manipulating the spectacle to gain valuable information. In 2012, we have new assets that did not exist a mere eight years ago, particularly in communications.

Steven van Roode of the Netherlands has been especially valuable for offering local observing circumstances for observers, for his prolific contributions to a transit of Venus blog, and for initiating the Transit of Venus phone app (transitofvenus.nl/wp).

Rather than having a handful of trained scientists around the world at known locations timing the transit, as was done in the past, the free phone app allows citizens to tap a button on their smartphones, which then send the GPS locations and observed contact times to a database to quantify the AU. Astronomers Without Borders is partnering with van Roode to implement this project.

There is a deep pool of math into which educators can wade with the transit of Venus. Two good resources are van Roode’s Transit of Venus Workbook and Sten Odenwald’s (NASA GSFC) Transit Math series on the Sun-Earth Day website. For middle school students and teachers, the Transit Frequency Activity uses a simple paper plate to explain the strange but regular pattern in which transits come in pairs separated by 105.5 or 120.5 years.

There is also a Postcard Activity, in which observers draw their impression of the experience in a roundel printed on a transparency, akin to the windows honoring Jeremiah Horrocks at St. Michael’s Church in Hoole, England. In the banner write commemorative words, then simply color remaining panes segments and affix to a window.

The Venus illusion

After the 2004 transit of Venus, the one observation which people were most eager to share with me was their sighting Venus in transit when the sun was at the horizon. A Venus illusion, akin to the moon illusion, enthralled observers who had an ideal, clear horizon.

I know it is contrary to all advice about looking at the sun with the naked eye, but I also know everyone has looked at a sunset, when the edge of the sun makes its own contact with the distant edge of Earth. If your location has those circumstances, witness Venus at sunset and write down your observations for later reference.

Seize the daylight

If the 2012 transit of Venus trends like its 2004 cousin, expect a huge surge in popularity in June.

Sure, you should guide your community to experience safely this elegant celestial rarity. But don’t let the burdens of accommodating an audience at a sun-aimed telescope prevent you from enjoying Venus’ moment in the sun. Savor the sight; bask in your good fortune to witness it; share your experience in writing afterward.

The planetarium landscape will likely be vastly different in 2117 and 2125, but the awe elicited by Venus passing in front of the sun is timeless.
the largest optical component in the theater isn’t your projection system...

it’s your dome

Perfect image quality is impossible without a perfect dome. The Spitz NanoSeam dome is completely seamless under projection. Unlike other domes, NanoSeam has no overlapping panels, so the screen is perfectly uniform - even the rivets are flush with the dome surface. NanoSeam, combined with Spitz’ durable powder-coat finish, is the perfect dome for advanced display systems.

Customers who demand the best projection quality consistently choose the best dome screen in the world. The NanoSeam process is a great option for repaneling your existing dome - even if your dome wasn’t made by Spitz. Isn’t it time to contact us, and learn more about the world’s leading projection domes?
The oldest scientific institution in the western United States, the California Academy of Sciences has reinvented itself in a new building in San Francisco's Golden Gate Park. The academy operates the largest green building in the world open to the public—and the only one to house a research institute, aquarium, natural history museum, and planetarium.

In the three years since reopening, the academy has welcomed nearly 5.3 million people to the new building, offering a venue for diverse audiences of all ages to explore and connect with the natural world and the scientists who study it.

With its commitment to studying life, the academy has a vested interest in teaching about the shared origin of life—and by extension, the connectedness of all life on Earth. Building on its own research strengths as well as relationships with the NASA Astrobiology Institute (NAI) and the SETI Institute, the academy has produced a planetarium show focused on the origins of life.

Beginning with the development of structure driven by dark matter and the cosmological genesis of heavy elements, the show traces the development of life on Earth and considers the possibility of microscopic life on other worlds.

The show's overarching message communicates to audiences the very real bonds that connect all life on Earth.

Advisors for the planetarium show included: David Deamer from the University of California, Santa Cruz; David Des Marais from the NASA Astrobiology Institute; Tori M. Hoehler from NASA's Ames Research Center; David Mindell from the California Academy of Sciences; Carl Pilcher from the NASA Astrobiology Institute; W. Brian Simison from the California Academy of Sciences; and Jill Tarter from the SETI Institute.

From redwoods to photosynthesis

The show begins in a redwood forest, with the sounds of wind and life and touches of movement in the trees. One redwood looms large as the camera rises into the canopy, then approaches a branch and enters a single redwood leaf.

As the camera travels into the leaf, the perspective shifts to microscopic scales, until the observer enters a cell to see a pared-down version of its interior workings, learning about the process of photosynthesis and the role of DNA.

A direct quote from the show: “You and I and the redwood share the same molecular building blocks because we share an evolutionary heritage that stretches back billions of years.”

To set up the concepts in the shot, we wanted to open the show at a human scale—in a

Image above: Source photography for recreating the redwood forest at the beginning of Life: A Cosmic Story. The original image measures 12,000 by 6,000 pixels. © California Academy of Sciences; used with permission.
recognizable and characteristically Californian environment, namely, a redwood grove. We strive to create provocative imagery that engages and inspires the audience.

Our challenge was to create a “powers of ten” shot that depicts a continuous journey from the human scale of the redwood forest to molecular scale on the surface of a thylakoid in a palisade cell of a redwood leaf.

To do this, we spent considerable time calculating the relative scale of everything between the redwood forest and the surface of the thylakoid and followed numerous filmmaking techniques learned from the visual effects industry.

Shooting video for a fulldome environment such as the Morrison Planetarium poses several challenges. Today’s video cameras lack sufficient resolution to create a high-quality image on the large curved screen, at least when saddled with a fisheye lens. Also, the continuous camera moves from one world to another that we like to use in the planetarium are sometimes impossible or near impossible to achieve with a physical camera.

Thus, we often create high-resolution, photorealistic moving image sequences by creating a virtual environment composed of photographs placed in three-dimensional space and then animating a computer graphics (or virtual) camera path, and rendering the result.

Source imagery for the redwood forest came from Bohemian Grove in Muir Woods, photographed with a Nikon D3X camera and a 17-mm lens, shot from a fixed point on a tripod as the sun started to come over the hills.

A total of 37 views cover 360° total; each view involved five levels of bracketed exposure for a total of 185 photographs at a resolution of 6,080 by 4,044 pixels. The entire shoot took about 20-25 minutes, after several days’ scouting, planning and testing.

We combined each view into a high dynamic range (HDR) image using Photomatix Pro, and stitched together all 37 HDR images into a 360° equirectangular spherical panorama at 12,000 by 6,000 pixels using PTGui. We then separated the panorama into multiple layers with transparency masks using Photoshop and Nuke.

The next step involved modeling the three-dimensional geometry of the redwood grove using Softimage GATOR (Generalized Attribute Transfer Operator). This tool allowed the modeling of each redwood tree using a live high-resolution texture projection from the spherical panorama as a reference.

The foreground branches were created from a high-resolution photograph of a redwood branch shot in front of a black screen in our studio. We created the three-dimensional model of the branch by tracing the photograph onto a polygon mesh, which was then bent, twisted and copied multiple times.

The foreground leaf was created from several high magnification microscope images of a redwood leaf. The images were combined and cleaned up in Photoshop to create a 15,000-pixel-wide image. The extreme close up, three-dimensional details of the leaf were modeled in Softimage using the contours of the microscope images as hints for the shape of its surface.

Realism is important

Working for a research institution, we needed to populate our forest with appropriate species. The ants (Stenamma diecki) were modeled, textured, and animated in Maya, based on observations of living specimens supplied by academy entomologist Brian Fischer. Butterflies (western tiger swallowtail, Papilio rutulus) and birds (junco) were also animated in Maya. California ground squirrels (Spermophilus beecheyi) were shot with HD video in San Francisco’s Golden Gate Park and composited in Nuke.

We designed the interior of the leaf as well as the cell structures—from the major organelles to the interior of the chloroplast—based on a combination of reference diagrams and micrographs. Microscopic images of the leaf textures were captured by the academy’s botany department as photo-textures.

The surface of the thylakoid shows an appropriate population of four molecules involved with photosynthesis: ATP synthase, photosystem I, photosystem II, and cytochrome. We also populated the region around the thylakoid with an appropriate numerical density of individual ATP molecules, although all other molecules (ADP, water, etc.) were removed from view. We used Molecular Maya® to import molecular models from the Protein Data Bank (PDB® archive used by researchers to store and share molecular structures. Animation of the ratcheting motion of the ATP synthase molecule is based on re-
search by John M. Walker at Cambridge University.2

**Dark matter and the first stars**

To understand the shared relationship between all life forms on Earth, the show moves backward in time, billions of years, to the origin of elements themselves. The early universe contained mostly dark matter, which drove the formation of structure, so the visuals transition to the Bolshoi simulation depicting the formation of large-scale structure. Bolshoi is a cosmological cold dark matter simulation that also incorporates dark energy; the simulation uses eight billion particles in a volume approximately one billion light years on a side,4 computed at NASA Ames Research Center.

Furthermore, the Bolshoi simulation makes use of WMAP5 parameters (Hinshaw et al. 2009),5 consistent with WMAP7,6 which provides a much better match to the best available cosmological data than the WMAP1 cosmological parameters that drove earlier simulations.

In spite of Bolshoi’s strengths, we see very little of it. The first stars formed at a redshift of approximately 20 (when the universe was less then 200 million years old), at which point the Bolshoi simulation has formed very little structure. Dark matter gravitationally attracts ordinary matter in sufficient densities for the hydrogen and helium present to form the first stars, which we observe in a simulation from Tom Abel at the Kavli Institute for Particle Astrophysics and Cosmology, SLAC National Accelerator Laboratory, Stanford University. The Bolshoi simulation at z=20 simply provides a backdrop for the “first stars” simulation in the foreground.

Primordial, massive stars tended to be bright and hot. A star made of 100 solar masses of hydrogen and helium, for example, would have a surface temperature of 200,000 K, almost 40 times that of the sun, and a luminosity a million times greater. Energy output from these stars evacuates their surrounding regions within a period of a few million years.

From the show: “At the end of the star’s life, the surrounding density may be as low as 0.1–1 particles per cubic centimeter. With such low densities, if the star dies in a supernova explosion, the heavy elements it ejects can travel more than 1000 light-years into the intergalactic medium. ... Indeed, as many as one in a thousand carbon and oxygen atoms in our bodies is now thought to have been made in the earliest generations of massive stars.”7

The Stanford team rendered all the imagery for their sequence in collaboration with our team, and Ralf Kähler has made a QuickTime available on his website.8 We selected a muted color palette, choosing to depict neutral gas in highly desaturated blue and ionized gas in pink (recalling the pinkish glow of ionized hydrogen).

**Galaxy and solar system formation**

Moving forward in time, the show dives into the Milky Way of approximately five billion years ago. The academy collaborated with the National Center for Supercomputing Applications (NCSA) Advanced Visualization Lab (AVL) to create a flight toward a giant molecular cloud with embedded star-forming region, inside of which we encounter a protoplanetary disk surrounding the sun.

To create this sequence, AVL used custom rendering software, visualizing an adaptive mesh simulation from Alexei Kritsuk and Michael Norman, University of California, San Diego (UCSD)9 integrated into AVL’s existing Milky Way model. Within the molecular cloud, AVL embedded a protoplanetary disk model provided by Aaron Boley, Sagan Fellow at the University of Florida,10 which represents how our solar system may have looked prior to the formation of Earth.

The most significant discussion around this sequence related to the visualization of both the giant molecular cloud and the Milky Way. Initial storyboards suggested depicting the cold, dense gas and dust in an “infrared” view that would have rendered the material in a glowing red color scheme, suggesting far infrared emission, much like the IRAS/DIRBE 100-micron dust map released by the Infrared Processing and Analysis Center (IPAC).11

Although AVL created initial test frames with the colorized material (and IPAC background dust map), we ended up opting for a more naturalistic approach of rendering the

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3 www.mrc-mbu.cam.ac.uk/research/atp-synthase
8 www.slac.stanford.edu/~kaehler/movies/first-stars-SD.mov
11 spider.ipac.caltech.edu/staff/jarrett/irsa/dust.html
material to occlude more distant luminous sources. Thus, the molecular cloud appears as a shadow against the Milky Way. Although the scene demands a lot of relatively low-contrast fulldome projectors, it offers a remarkable sense of depth and presence when approaching and entering the molecular cloud.

**Evolution of Earth**

Approaching the Archean Earth, the camera splashes down in deep water to visit a hydrothermal vent, at which point the perspective shifts to the microscopic scale to examine a hypothetical scenario in which metabolic processes may have started—the formation of organic molecules in the presence of a geothermal energy source.

Our list of molecules suspended in the water included sodium chloride, potassium, magnesium, carbon dioxide, and bicarbonate, along with trace amounts of ribose and glycerol. As with the photosynthesis sequence, we used Molecular Maya to import molecular models from the PDB archive.

After the viewer rises through the scattered molecules to emerge at the surface of the ocean, the show then focuses on a volcanic island as another possible location for early life to have gotten its start. An enriched “hot puddle” of water, alternating between wet and dry states, could have provided an environment for nucleotides (building blocks of RNA and DNA) to wrap themselves in protective vesicles.

We shrink our perspective once more to observe adenosine monophosphate (AMP) and uridine monophosphate (UMP) molecules enclosed by a lipid layer. Again, we used Molecular Maya to import molecular models from the PDB archive.

Once life took hold, it radically changed our planet, and at this point the show returns to a global view of Earth to fast-forward through select snapshots depicting reconstructions of our world during a succession of geological eras.

Earth’s early microorganisms created our oxygen atmosphere, when they invented the photosynthetic process we saw earlier in the show. Cyanobacteria released oxygen into the atmosphere, burying the carbon in sediments.

Billions of years ago, the collective activity of these tiny bacteria started both the carbon cycle and our modern atmosphere—and may have also triggered a global ice age, causing temperatures to drop precipitously, nearly freezing out life on our planet.

This activity may also have helped trigger a significant leap toward multicellularity—we jump to the beginning of the Cambrian Era, when more complex creatures began to appear in the so-called Cambrian Explosion.

Stepping forward through time, we visit Earth during the Carboniferous Era, when plants emerged onto the land and turned Earth’s continents green. We continue leaping forward in time, viewing the movement of continents and the changing environment for life, until we reach modern Earth.

Our science advisors agreed that there were two potential providers of paleogeographic data that could drive the narrative about the development of life on Earth.

We initially approached Ron Blakey, professor emeritus of geology at Northern Arizona University. His maps adopt a photoreal approach consistent with the look we wanted to achieve, but we quickly recognized that his science source for many of the eras we wished to depict were based on the work of the other key source, namely Christopher Scotese, a professor of earth and environmental sciences at the University of Texas, Arlington. His Paleomap Project\(^\text{12}\) attempts to illustrate plate tectonic development of ocean basin and continents as well as the changing distribution of ocean and seas over the past 1.1 billion years.

The Scotese style offered a less photoreal look than our target, but we worked with his data to define the continental shelves and the ocean land boundaries and his work acted as a guide for vegetation-covered vs. arid areas.

We used a program called Terragen\(^\text{13}\) that allowed us to re-work his maps into a style that was consistent with the visual flow of the program leading up to this sequence. We also used Terragen to create cloud layers appropriate for each epoch.

**On to discuss life on Mars**

In the Morrison Planetarium, a presenter delivers a segment of the show about the possibility of life on other planets, which highlights recent discoveries about Mars, extrasolar planets, and so forth. The length of the live portion varies according to the turnover time of the theater: the academy runs planetarium shows on both 45- and 60-minute cycles, depending on the projected attendance.

For the distribution version of the show, we eliminated the live “break” and added a segment in which we leave Earth behind to visit Mars, where audiences see the planet transform to an earlier state, billions of years in the past, when it more closely resembled early Earth. Dipping down toward the surface of the planet, we see a vast salty ocean and a denser atmosphere.

David Des Marais from the NASA Astrobiology Institute provided the most significant consultation on this sequence. Google Mars
played a critical role in identifying regions on Mars with decent data coverage, and we ended up selecting from the short list of proposed Mars Science Laboratory (a.k.a. “Curiosity”) landing sites. We chose Mawrth Vallis because of its location on the edge of a northern-hemisphere ocean that once covered approximately a third of the martian surface.

Michael Brooten, at the time affiliated with the Intelligent Robotics Group at NASA Ames Research Center but now attending graduate school at Stanford University, provided considerable assistance locating high-resolution imagery from various Mars-orbiting spacecraft. The global base map used for most of the planet came from Malin Space Science Systems’ version of the Viking MDIM 2.1 Mosaic, originally assembled by USGS Astrogeology Branch in Flagstaff, Arizona.

For Mawrth Vallis, we required significantly higher-resolution imagery, for which we made use of Mars Express data processed by Gerhard Neukum at the University of Berlin. All imagery required significant color correction to bring various data into the same color space, and we then transitioned to a different, darker color scheme for early Mars—as per the advice of Des Marais.

Using global altimetry data from the Mars Global Surveyor (MGS) Mars Orbiter Laser Altimeter (MOLA) instrument, which measured altitudes on Mars to an accuracy of 10 meters, we then approximated the ancient ocean basin by “filling up” the lowest-altitude regions of the planet’s northern hemisphere to a height of 3.5 kilometers below the Mars areoid (for comparison, Olympus Mons lies 212 kilometers above the Mars areoid, while the lowest point of Hellas Crater lies 82 kilometers below). We created some finer surface features, including rivulets and tributaries, to match the higher-resolution imagery.

For the martian atmosphere, we consulted with Robert Haberle, part of the Planetary Systems Branch of NASA Ames Research Center, to arrive at an elevation of the water clouds between 5 and 10 kilometers and the carbon dioxide clouds around 20 kilometers.

Evidence for the origins of life

After the visit to Mars, the show’s focus shifts to Earth once more, with an emphasis on specific sites where scientists have discovered signs of early life. Viewers circle the modern globe to review specific locations where geological or fossil evidence exists to support the narratives: Isua, Greenland; Marble Bar, Australia; the Great Lakes of North America; Nama, Namibia; and the Burgess Shale.

At each step of the way, the specified location appears highlighted on Earth, along with still images of the locations and the specimens from each site splayed across the dome as if adhering to the interior surface. As the sequence progresses, images fill a greater percentage of the open area of the dome, reflecting the greater amount of evidence and greater diversity of life over time.

Recent epochs are well represented in the geological record, whereas evidence of more ancient life proves increasingly challenging to detect. Rocks from Isua, for example, show variations in relative isotopic abundances that suggest material processed by life, dating back perhaps 3.8 billion years. More direct physical evidence does not show up in the geological record for hundreds of millions of years.

Conclusion

Images of fossils give way to a collection of two-dimensional images of modern life, arrayed in three-dimensional space. Why does contemporary life tell us about life’s history? Because all life shares common ancestry and common chemistry; we are all related at the molecular level.

As viewers learn this, they pull away from the individual images of life taken from the academy’s Manzanita Image Project, and we end the show as we see their three-dimensional distribution beginning to form the structure of the double-helix strand of DNA. The audience is left immersed inside a representation of the structure of life’s shared origins.

Reception and effectiveness

Approximately 600,000 people have seen Life: A Cosmic Story in the Morrison Planetarium since its opening in November 2010. In general, the show has received a tremendously positive response and has garnered significant attention, including mention in an article in The New York Times. Mot recently, the 2011 Jackson Hole Wildlife Film Festival awarded Life: A Cosmic Story the Best Fulldome Program.

The Academy collaborated with Rockman et al. on evaluation of the show, primarily to identify visitor satisfaction and their comprehension of broad learning objectives.

14 astrogeology.usgs.gov/Projects/MDIM21
15 mola.gsfc.nasa.gov
16 tharsis.gsfc.nasa.gov/spec.html

17 http://research.calacademy.org/library/collections/manzanita/
19 Results cited from surveys conducted on 4 and 14 February 2011 of the 45- and 60-minute versions of Life: A Cosmic Story (the 45- and 60-minute lengths refer to the time in which the theater is turned, not to the length of the presentation). Of 842 respondents, 55.4% were female, 66.2% were members, and 72.7% were visiting the planetarium for the first time.

Overall, the show scored quite high among respondents on educational value (92.8% rated it “excellent” or “good”), entertainment value (88.4%), and technical quality (95.4%). Fully 82.3% agreed or strongly agreed with the statement that the show exceeded their expectations.

On seven select content points, audiences showed a greater than 85% agreement with concepts presented in show, including: 1) dark matter has an effect on us (90.8% agreement), 2) supernovae are responsible for seeding the universe with elements required for life on Earth (87.5%), 3) stars form inside dark, dusty regions (92.1%), 4) four billion years ago, Earth looked very different from today (92.1%), 5) all life on Earth shares the same genetic code, DNA (87.1%), 6) organisms and environments evolve in concert (83.5%), and 7) temperatures on Earth have been affected by life (91.8%).

We completed the distribution version of Life: A Cosmic Story in the spring of 2011, and the academy has actively engaged many planetarium companies in distributing the show to fulldome theaters. Interested parties can contact us at domeshows@calacademy.org for more information on leasing.

Going digital in Minnesota

Speaking of digital projectors, as I finish writing this column, my planetarium at Minnesota State University– Moorhead has just installed a digital system. It looks wonderful and I am looking forward to using it to further educate our audiences about the wonders of the universe and the world that we live in. After 40 years in the planetarium field, I feel like I’m starting all over. I have a lot to learn. I am looking forward to it!

I reflected recently on the fact that I am half way through my two-year term as president and also at the midpoint of the six-year cycle of president elect, president and past president. When I was elected in 2008, six years seemed a long time, but now, looking back, the past three years have passed so quickly! It is a privilege to serve you all. You are the reason that IPS exists. It’s your Society and I encourage each of you to get involved.

Give something back to the profession. Why not do a poster or a paper at this year’s conference in Baton Rouge? Consider the possibility of volunteering to serve on a committee or to run for an office.

For some of our international members, this is the last issue of the Planetarian that you will receive before IPS 2012. I look forward to meeting many of you personally in Baton Rouge.
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For licensing, contact Dan Neafus or Jess Wellington at CosmicJourney@dmns.org or 303.370.8352.

When we opened as the Gengras Planetarium in 1968, we had one of the newest planetarium instruments on the market: the Spitz STP. The Gengras Family made a generous donation so that we could have computer-controlled hemispheres that moved in all three axes and a built-in sound system.

The museum built a new wing that included a sweeping spiral staircase and a gallery for astronomy and space exhibits. In the 1970s, an evening at the planetarium was a special event.

For nearly 40 years, the Spitz STP served as our main instrument. Over the years we added special effects, slide projectors, Sky-Skan SPICE automation, and a LFI International laser system to our 12.2-m dome.

The planetarium staff drew their own constellation overlays, painted panoramas scenes, recorded music and sound effects, and produced their own shows.

At the height of our creative output, the staff collaborated with other venues such as the Fels Planetarium at the Franklin Institute (Mars: Fourth Rock from the Sun) and distributed shows to other planetariums across the country. A former employee went on to work in design for television.

In the last 15 years, we’ve created a few shows for our own use and had some small success with Dragons in the Stars, produced by former director Jason Archer, but we purchased most of our programs from other vendors. We no longer had artists and photographers on our staff, materials for slide production became scarce, and we spent more time each day repairing our failing machines.

From slides to fulldome

In the summer of 2007 the planetarium was given a corporate donation by Travelers Insurance that allowed us to purchase a Spitz SciDome HB. We pulled out our STP and sent the body to Owen Phairis’ Planetarium Projector and Science Museum and some spare parts to the Miami Science Museum.

The SciDome system comes with Starry Night Dome software for simulating the night sky. It also comes with ATM-4, which allows us to string Starry Night favorites and media into a timeline for playback on the dome.

When we opened the planetarium, now known as the Travelers Science Dome at the Gengras Planetarium, we offered a schedule of fulldome animated “movies” such as Secret of the Cardboard Rocket and Oasis in Space, each with a short live sky segment at the beginning. Since we had so many slide-based shows in our library, we continued to use our SPICE automation system for school programming with the SciDome standing in for the STP’s stars.

Over the next four years, we scanned, resized, and drew the pictures from our physical slides. We converted our old all-sky and panoramic images to digital. We pulled the video clips that were once projected by a BARCO through our Betacam and LaserDisc machines and converted them into movie files that SciDome could play.

When we were permitted, we loaded in some of the shows we had purchased from other vendors and converted them for use in
SciDome. Essentially, we were re-creating the traditional slide planetarium show using our SciDome’s ATM-4 automation software.

We wrote our first program specifically for the SciDome based on the state of Connecticut science curriculum standards for grade 5 and covering the sun, Earth, and the moon.

The show is still very popular with educators because of the content, but we’re not satisfied with its visuals. There are short video clips and sky scenes, but most of the illustrations are still images loaded into the SciDome, similar to traditional slide shows. We wanted to be able to do more with our new technology than we could with the old.

Staff changes

Kyra Elliott joined the planetarium as assistant director in January of 2009. With a background in astronomy and some computer animation, she began to research the production of animated fulldome content.

Xtreme Weather was a show written and produced by our planetarium as a traditional slide show. A new soundtrack had been recorded as part of a plan to convert this show for use in SciDome. Kyra decided to create a “hybrid” show that still used the SciDome ATM-4 software.

The show employed a combination of still images and Starry Night favorites. Kyra added 30% original fulldome animations produced on her personal laptop with Autodesk Maya and rendered using MentalRay.

The fulldome effect was achieved within the software by aiming a standard camera at a reflective hemisphere in the scene.

The drawback to this method was the vast increase in render time due to the need to calculate reflections for each frame. The complexity and length of the fulldome scenes were compromised due to the limitations of our hardware.

Planets: from blue to red

In 2010 The Children’s Museum was awarded a three-year, $590,000 grant from NASA’s Competitive Program for Museums and Planetariums to fund From the Blue Planet to the Red Planet: Exploring Planetary Science. The package included money for a museum exhibit, new education programs for schools and the general public, and teacher professional development. All aspects of the program were to include information about the geology, climate, history, and exploration of Mars.

Funds were included for the planetarium to purchase a commercial program, Invaders of Mars, and to create a new planetarium show that compared Earth to Mars. When first we wrote the grant in 2008, we expected to put the program together with NASA images and video and to add music and narration. We would use the SciDome’s ATM-4 software to compile the pieces into a single file for playback in our own dome. Then, we could offer the pieces of the production for compilation in other SciDomes.

After three years of working with the SciDome, and the success of the production of Xtreme Weather, we decided we could do better than our previous productions. Rather than use static images and other people’s video, we would attempt our first completely fulldome, pre-rendered production.

When asked the question, “Can the two of you make a fulldome movie with only $28,000?” the answer had to be, “Yes.” This was our chance to revive our once-vibrant production facilities.

The production office

Our first task was to refurbish a windowless space that has always been known as the production office. This was the place where we sorted slides, stored old slide projectors, and dumped exhibit pieces. We added heat and better lighting, threw out a ton of junk, and installed shelving and a wrap-around desk.

The next task was the challenge of purchasing the necessary hardware and software. With the help of Matt Mascheri from Dome3D, we assembled a list. For hardware, we purchased 5 HP computers (one to serve as the work station and four to be render nodes), two monitors, and a Windows Home Server with 4 TB of space. We purchased home-office grade computers with high specifications rather than actual graphics work stations to save money.

For 3D animation, we purchased 3DS Max 2011 with VRay for rendering. VRay provides the virtual “full dome camera” used to render out dome masters of an animated scene.

For editing, we purchased Adobe Creative Suite 5 with the Navegar Fulldome plug-in for After Effects. Finally, we got a Canon EOS 7D camera with a Sunex fisheye lens to capture time lapse and still photography for use in the dome.

Since the museum recently upgraded its computer network to a cable system, we had an open DSL line that we could use for remote access and downloads. Matt Mascheri came out to our facility to help Kyra with the setup of our rendering network and to train her on some of the new software. She moved all of her files into the new office and even added a fish tank to make up for the lack of outside air.

Most of our budget went to purchasing the equipment and services for our new production studio. Our passion and creativity had to take us the rest of the way.

Planning a new program

When we wrote our grant application, we promised that our planetarium show would compare the geologies, atmospheres, and weather events of Earth and Mars and include images and models of NASA Mars exploration missions. We’ve used this NASA data throughout our planning process, but we made some changes to the tone of the program based on what we perceive as the needs of our audience.
We are located inside a children's museum. A group of guests could include infants and senior citizens, families with older children, or even just young adults on a date. They prefer shorter shows, under 30 minutes, with engaging stories and sympathetic characters.

Programs with omniscient narrators don't do as well in our dome as those with smart children or clever cartoons. Our guests want exploring stars, flights to the moon, and futuristic fantasy sequences.

Our goal was to combine what we know about Mars into the familiar framework of an intergenerational story that could be appreciated by an entire family. We worked hard to determine a story with content that met NASA's standards, but could appeal to our unique audience. As such, we chose as our main characters a boy of about 14 named Aidan and his young adult sister Carina.

Carina is stationed at a base on Mars called Camp Viking. She is taking part in a research fellowship and reports back to her brother about what she is doing. He responds with news from Earth and is chosen by his school to do an internship at Lunar Base.

From their messages to one another, we learn about the atmospheres of Earth and Mars, some of the history of Mars exploration, and the challenges of space travel. They cannot talk directly because of the transmission delay between Mars and Earth.

We took a risk setting the scene in the future because there are so many things about Mars that we can't yet confirm. Our script was vetted by our NASA grant advisors and a JPL scientist to be sure that we didn't make any huge factual errors or veer too far over into science fiction.

Once we had a script we were satisfied with, we hired an artist, Julia Huntsman, to sketch our storyboards. We needed the storyboards to keep us on track and to submit to NASA for official Science Mission Directorate review.

Any materials produced through our grant that we want to distribute with the NASA seal have to be approved by The Institute for Global Environmental Strategies (IGES). We are please to announced that our show was given final approval in mid-January of 2012.

Production
As of January 2012 Kyra has built and textured all of the architectural scenes that will be depicted throughout our film. These include Camp Viking and several interior scenes of the base, Aidan's bedroom, Lunar Base, Camp Mariner (a second station near Mars' Mariner Valley), and the interior of the rover that the astronauts use to travel across the martian surface.

Kyra is currently beginning the next phase of building all machines, such as the rovers and spacecraft. While the inside of the rover is completely built and textured in 3D, the view of the outside of it so far only exists in a two-dimensional sketch.

Upon completion of this phase, Kyra will begin the modeling of all landscapes and atmospheric effects. We are currently in correspondence with the High Resolution Imaging Science Experiment (HiRISE) team at the University of Arizona to obtain the necessary digital terrain data to aid us in the accurate construction of Mars landscapes.

The final phase of animation is due to conclude mid-summer, with the addition of characters into the appropriate scenes.

With our extremely limited staff and funding, Kyra is designing our animated scenes to allow for minimal post-production time. One example of this is our method for integrating characters into the movie.

The characters in our story will not be on screen very much in the final movie. As this is our first attempt to integrate live action into full-dome animation, we will not be filming our characters with the fulldome camera. In the scenes where Carina is shown inside the Mars base, we will use a standard camera to film the actor against a green screen. The animated background will be rendered separately, and the two will be combined in post production.

In our story, Aidan receives video messages from his sister on Mars. To eliminate the need for camera tracking, Kyra is applying these composite videos as a texture on the TV model in Aidan's bedroom. Rather than adding the videos to Aidan's TV screen in post production, we are rendering finished dome masters, complete with a TV displaying a video on screen. When Carina is seen by the audience, she is being seen from Aidan's perspective, on a TV screen. We hope to explore camera tracking and the capturing of fulldome live action in future projects.

Going forward
In the next nine months, we will employ an outside contractor to do our voice recording, sound effects, and music. Our actors will come from Hartford Children's Theatre to perform the parts of Aidan and Carina. The entire show should be assembled and ready for distribution by December 2012.

If anyone is interested in learning more about From the Blue Planet to the Red Planet or our production process, please contact me at kmazzoni@TheChildrensMuseumCT.org or Kyra at kelliott@TheChildrensMuseumCT.org.

For general information about the Travelers Science Dome or The Children's Museum, please visit our website: www.TheChildrensMuseumCT.org.

Support for From the Blue Planet to the Red Planet at The Children's Museum made possible under Grant No. NNX10AK13G with the National Aeronautics and Space Administration. Any opinions, findings, and conclusions or recommendations expressed in this show are those of the author(s) and do not necessarily reflect the views of the National Aeronautics and Space Administration.
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In our profession, we have to do lots of different kinds of tasks to get the job done—you know what I mean. And, if you work at a facility that has more than a planetarium theater, like a museum or nature center, you probably have even more jobs requests out of the dome.

Have you ever been asked to do audio-visual work? Maybe you need to do the layout or design of a new exhibit, or even do audio-visual design for a meeting room or auditorium. Most of us should probably be able to design something really nice with the right equipment to meet the needs of the room. But, sometimes, it is difficult to get started knowing what type of equipment to get or how to do the precise layout of equipment in order for it to work simply and consistently.

This article will cover some basic concept ideas and some interesting technical tidbits that I’ve learned while designing and installing a home theater in our log home. No, the theater is not for public use, but I wanted it to be simple, work right every time, look clean and line up the optical components correctly so that we got the best results. Even better, these design concepts can easily be applied to any public facility.

What is your goal?

This is the first step. You need to decide what you need as opposed to what you want. This is good for two points: one, it keeps the project focused and as simple as possible; and two, it keeps costs down.

For our theater, we wanted the biggest image projected from a Blu-ray player and computer while making sure it was comfortable to view. We didn’t want to see any wires, nor the screen case. We also wanted to provide some ambient lighting while not seeing the light source. Surround-sound would be the audio of choice.

The projector would eventually be an LED HD (high-definition 1080 pixel) projector that can handle data rates for 3-D content and accept a computer input, as would the Blu-ray player. The screen would be large enough to accommodate the above requirement, have the right gain and be motorized. A cabinet would be made to hold the A/V equipment, be able to handle cable runs, and allow space for air venting.

Part of our goal was to keep costs down by getting what was needed and doing all the woodworking ourselves. We also designed the project to be done in stages. I would not recommend staging a project for a public facility this way because the funding always seems to disappear later on and you’ll be stuck with a partially-done room.

In our personal staging of the project, we’ve delayed the majority of the costs and will stagger them so as to not have a single, large purchase. Although I wanted the advantages of an LED projector, they are still very costly. I’m also sure that LED as a light source will eventually take over as the lamps of choice for most projectors in the next few years.

In the meantime, then, we purchased an inexpensive DLP projector with 800x600 resolution. It has VGA, S-Video, and RCA video inputs. We’ll use this projector for a few years and replace it when LED projectors become affordable. Our DVD movie collection is 720x480, so the DLP resolution is fine for this purpose.

For years we used our MacBook’s DVD drive to play movies on a 13-inch screen. (You probably don’t know that my wife and I stopped watching TV back in January 2000. We’ve been sane ever since.) About a year ago, we invested in the first component of the new system, the DLP projector, using my father’s very old portable screen (circa 1970’s). This was replaced by a new screen. Details about screens will come later in this article.

Another component yet to come is the surround-sound system, which we plan to look into in about a year to replace the very good, but old, stereo we now use.

Just to recap, we’ve already purchased and installed over the last year or so an inexpensive, temporary projector, a projector mount, a Blu-ray player, cove lighting, the screen, and the woodwork casement. We will purchase in the next few years an HD projector and a surround-sound system to complete the project.

Do the research

Now that you have determined what you need, you’ll need to find out the details of the equipment, how it will be installed, and how it will be used. Here is where I found out some interesting and sometimes discouraging information about what we wanted to do.

I’ve already mentioned projectors, and the research revealed that there are many types out there and many specs to decide on. How good is the product and its company? How do they generate the image? How bright is the image? What’s the contrast ratio? What’s the pixel quantity? What’s the pixel ratio?

Basically, since we want to watch movies in HD, the 16x9 format with 1920x1080 pixels will be our choice when it’s time to purchase a better projector. It will also have a brightness value of 2,000-3,000 lumens, which will allow (Continues on Page 38)
While hunting for fossils, The Zula Patrol discovers that the villainous Deliria Delight has been illegally dumping her company’s toxic trash in Earth’s prehistoric past. The Zula Patrol must find and catch her, before her actions ruin the planet. In the process, our heroes learn all about the formation and development of Earth, and the life forms who call it home. 24 minutes.

The Zula Patrol is on a scientific expedition using their loyal pet Gorga’s ability to collect and bottle all kinds of weather. When nefarious villain Dark Truder tricks Gorga into stealing the weather from Earth and other planets, The Zula Patrol goes after him, learning all about weather - both terrestrial and interplanetary. 24 minutes.
As the apparently faster than light subatomic particles of destiny collide with those slow coach photons of fate, I find myself contemplating our place in this crazy, beautiful place we call the universe, and a memorable quote rises to the surface in my befuddled brain. It comes from the American journalist H.L. Mencken (1880-1956), who once wrote, “It is impossible to imagine the universe run by a wise, just and omnipotent God, but it is quite easy to imagine it run by a board of gods. If such a board actually exists, it operates precisely like the board of a corporation that is losing money.”

This gem of a quote got me wondering how the universe would look were it to be remodelled by a committee. Perhaps it may look something like this.

The Sun

If you turn to page 398 of this committee’s report, you will see that there’s not much wrong with the sun that we can improve upon. It’s a (sorry) shining example of efficiency, passing our time and motion study with flying colours. Never takes a day, or night, off. Bless. Just one thing, though. After polling committee members, it was felt that the sun could do with a face lift, so from next Monday it will glow a different colour on each day of the week.

Mercury

We feel this planet has more than served its punishment for some unknown misdeed in the dim and distant past, for which no archeval record can be found. I mean, really, too hot on one hemisphere, too cold on the other. Come on, guys, have some compassion here.

So, with immediate effect, we’re moving Mercury further out from the sun to share a similar orbit with Earth in the cozy, temperate goldilocks zone. May the best planet win, gravitationally.

Venus

Oh dear. Very embarrassing. The committee would like to apologise for a snafu many millennia ago by a previous committee member which inadvertently led to Venus’ high temperatures. You see, he was a terribly keen gardener who wanted to grow a ridiculous amount of tomatoes on every square inch of Venus, so he turned the place into a greenhouse. But, after teleporting the tomatoes to his home world when they ripened, he forgot to turn off the planet’s thermostat before leaving. Sorry! Anyway.

Earth

Odd one, this. The only planet with life forms. What’s up with that? As a committee we have to treat all planets equally, so we’ll populate all the other planets in this star system with life as well. A sub-committee is being organised to examine the problem of how cats and dogs can survive on frozen methane.

Moon

This accessory has proved so popular with Earth’s lovers, poets and astronomers that we have decided to put another one of them into orbit round the planet. That should speed the development of light pollution filters.

And if it’s that good at its current brightness, it must be even better when it’s brighter, so we’ll increase its albedo by 500%. So that’s two incredibly bright moons, plus Mercury looking huge in the night sky. The people of Earth will never stop thanking us.

Mars

First things first. We’re sending Elvis Presley back to Earth, as he’s been complaining about the cold on Mars. We are keen to get mass life back on the planet again, so as we’ve heard Homer Simpson is incredibly popular on Earth we’ll clone several million of him and send them to the red planet. What a society that should make. Envy of the whole solar system.

Jupiter

The committee is concerned that Jupiter has bullied more of its fair share of moons into orbit around the planet, so we’ll redistribute some of them to Venus, which has had to make do with none for way too long.

Also, studies sponsored by us have shown that the Great Red Spot may soon significantly diminish in grandeur, so we’re taking it offline for maintenance, which shouldn’t take more than 200 years.

Saturn

Those rings are the bees knees, for sure, but we’re concerned that Saturn’s upper atmosphere isn’t as colourful as Jupiter’s. We see it as a blank canvas crying out to be used, and so by way of meeting this committee’s overhead costs we are publishing a tender for companies across the universe who wish to project advertisements on to Saturn’s upper atmosphere. Standard contract #31416 applies and the highest bidder wins, of course.
Uranus and Neptune
It’s over-egging the pudding to have four gas giant planets in the same star system, and so, with efficiencies in mind, we’ll amalgamate Uranus and Neptune into one body. Any left over gas will be given to Mars to increase the density of its atmosphere.

Pluto
Pluto is anxious to resume its previous status as a fully-armed planet, so it has been sent the requisite 84 forms, all to be completed and filed at our nearest branch, which is in the vicinity of Alpha Centauri. We expect to make a decision before the turn of the next millennium.

Eris
We’ve mislaid our cue ball for the next annual Cosmic Pool Championship tournament, so we’ll use Eris instead. When we’re done it may come back a tad smaller, so it may lose its status as a minor planet. To make up for this, we’ll arrange for lots of comets to smash into it and increase its bulk.

Asteroids
Given the enormous popularity of Saturn’s rings, the committee feels it is only appropriate that we gather all the asteroids together, crush them into tiny particles and distribute them as rings orbiting all the other planets. Some committee members have noted that the new rings will ruin astronomy on Earth, but consensus was reached and it was decided that will be the life forms’ problem.

Comets
Comets are not very efficient in the use of their best asset—the dust that forms their tails—as the supply dries up after a few hundred orbits. This committee will install on each comet a device that will limit the release of dust on each passage, thus making for a greater number of spectacular passages. That’s the good news. And the bad? From now on, they really will be harbingers of evil.

Stars
Jiminy cricket, there are a lot of these. Some are much less efficient than others, which concerns this committee, as we can’t abide slackers. From now on, every star will be tested for its worthiness to exist, and those that fail to meet Wow! Factor® standards will be gently pink slipped out of sight into one of the bordering multiverses, where they can fend for themselves.

Constellations
We feel that the constellations are long overdue for modernising. Therefore, we have redrawn the constellation patterns to include 18 new ones, such as mobilephones, limousinecum and xfactorus.
If these prove to be popular we’ll move the relative positions of all the major stars from month to month, so there’ll be a regular flow of new constellations.

Nebulae
Oh dear. In stark contrast to the sun, nebulae across the universe consistently failed miserably our time and motion study. An average of one star produced every 100 million years? Are they having a laugh? Are they annoying us for charity?
From now on, we will add humungous amounts of extra hydrogen to nebulae, throw in a pinch of helium, ramp up the gravitational constant, leave to simmer, then, hey presto, bish bosh, Bob’s your uncle, there’ll be an average of one new star created every 100 years.

Galaxies
Yes, they’re beautiful, majestic and so on, but this committee abhors the practice seen in many galaxies of ejecting stars into intergalactic space. We will now be placing monitors at the edge of every galaxy to police such behaviour. Any transgressors will face heavy penalties, including, but not limited to, being removed from the prestigious Henry Draper Catalogue of Galaxies.

Black holes
Good cosmic vacuum cleaners, getting rid of some of the universe’s waste, but they can sometimes be a bit too enthusiastic and indiscriminate. We will substantially increase the number of white holes that reintroduce into the universe material that shouldn’t have been sucked up. We are now processing an application to have one positioned near Earth.

Interstellar space
Committees hate waste, and boy, is there a lot of wasted space between stuff in the universe. From now on we’re going to be tough on space, and tough on the causes of space. Therefore, with immediate effect, the universe will be dramatically decreased in size. There, you didn’t feel a thing, did you? The resulting savings in space have been used to build another universe. Feel free to visit it at your discretion.
So there you have it. A much more structured and efficient universe. You can see this committee’s full report on our website, www.ifyoubelievethis.you’llbelievewhere.com.
Minutes of the IPS Council Meeting  
Conference Room, Kremlin 
Nizhny Novgorod, Russia 
July 1 & 2, 2011

* indicates action items

In attendance:
President Dave Weinrich  
President Elect Thomas Kraupe  
Past President Tom Mason  
Treasurer Shawn Laatsch  
Secretary Lee Ann Hennig

Affiliate Representatives:
Association of Brazilian Planetariums (ABP) - Dr. Alexandre Cherman  
Association of Dutch Speaking Planetariums (ADSP) - Chris Jansen for Ad Los  
Association of French Speaking Planetariums (APLF) - Dr. Agnès Acker  
Association of Mexican Planetariums (AMPAC) - Dr. Martin George for Ignacio Castro Pinal  
Australasian Planetarium Society (APS) - Mark Rigby  
Canadian Association of Science Centres (CASC) - Ian McLennan  
Council of German Planetariums (RDP) - Thomas Kraupe  
European/Mediterranean Planetarium Association (EMPMA) - Manos Kitsonas  
Great Lakes Planetarium Association (GLPA) - Jeanne Bishop  
Great Plains Planetarium Association (GPPA) - John Hare for Jack Dunn  
Italian Association of Planetaria (IAP) - Shawn Laatsch for Loris Ramponi via Skype  
Japan Planetarium Association (JPA) - Kaoru Kimura  
Middle Atlantic Planetarium Society (MAPS) - Lee Ann Hennig for Patty Seaton  
Nordic Planetarium Association (NPA) - Lars Broman  
Pacific Planetarium Association (PPA) - Susan Button for Gail Chaid  
Russian Planetarium Association (RPA) - Zinaida P. Sitkova  
Southeastern Planetarium Association (SEPA) - John Hare  
Southwestern Association of Planetariums (SWAP) - Rachel Thompson for Linda Krause

Affiliates not in attendance:
Association of Spanish Planetariums (APLE)  
Rocky Mountain Planetarium Association (RMPA)

Guests:
Dr. Omar Fikry - IPS 2010 Conference Host, Director, Planetarium Science Centre, Bibliotheca Alexandrina Egypt  
Jon Elvert - Chair, IPS Outreach Committee, and Pennington Planetarium, Baton Rouge, Louisiana, USA, IPS 2012 Conference Host  
Celso Cunha - 2014 Conference Bid Host, President of Rio Planetarium Foundation, Rio de Janeiro, Brazil  
Melissa Ferreira - Press Advisor, Rio Planetarium Foundation, Rio de Janeiro, Brazil  
Robert Appleton - 2014 Conference Bid Host, Executive Director, H.R. MacMillan Space Centre, Vancouver BC Canada  
Dr. Jin Zhu - 2014 Conference Bid Host, Director, Beijing Planetarium, Beijing, China  
Xiao Lin - Translator, Beijing Planetarium  
Lu Xiaoming - Vice President, Beijing Academy of Science & Technology  
Martin George - Chair, International Relations Committee & Elections Committee  
Yaroslav Gubchenko - Executive Director, Fulldome Film Society, Moscow Russia  
Dr. Dale Smith - Chair, IPS Publications Committee, via Skype

The meeting was called to order at 9:05 a.m. by President Dave Weinrich. Dave welcomed the Council Members and guests and introduced several guests from the Nizhny Novgorod City Administration, the Nizhny Novgorod Planetarium, and the Russian Planetarium Association. Sergei Goren, Director of the Department of Cultural Support and Youth Activities welcomed Council to the beautiful city. Also in attendance were: Vadim Belov, Secretary of the Board of the Russian Planetarium Association; Zinaida Sitkova, Chairman of the Board of the Russian Planetarium Association; and Alexandra Timoshinova, Deputy Director of Cultural Activities. Dave and Council acknowledged our host, Dr. Alexander Serber of the Nizhny Novgorod Planetarium, who welcomed Council to Nizhny Novgorod and the historic Kremlin facilities and presented an overview of the facilities and events scheduled for the next two days. President Dave Weinrich and Council expressed their gratitude to Alexander and his staff for their efforts to provide a wonderful setting for the first IPS Council Meeting to be held in Russia. Following the introductions of Council members and guests, Dave recognized new Council members and reviewed the format for the Council meeting as well as changes in the agenda.

The Secretary’s Report on the Minutes of the 2010 Alexandria, Egypt Council Meeting had been previously published in the December 2010 Planetarian. The minutes were approved.

Treasurer Shawn Laatsch presented the Treasurer’s Report. Council reviewed and discussed specifics of the 2010 Financial Report, the mid-year 2011 Budget, and the proposed 2011/12 budget. The Audit Report of 2010 confirmed that the treasury is in good standing and the document has been posted on the Council Group Site. Shawn recognized Ash Enterprises and Digitalis for their contributions to promoting membership in IPS and reported that others are considering similar initiatives. The Treasurer’s Report was filed.

As Membership Chair, Shawn reported that the total membership as of July 2011 was 606. Shawn also provided an overview of the Associate Membership initiative to date. Discussion centered on the geographical nature of the Associates and the rate of conversion from Associate status to standard membership status. The Membership Report was filed.

Past President Tom Mason presented his final Past President’s Report, which will be printed in the September 2011 issue of the Planetarian. Tom reported on his efforts to assist the transition of the President Elect and the incoming President in their new roles. As Tom’s term of Past President comes to a close at the end of this year, he will continue to contribute to moving IPS forward.

President Dave Weinrich delivered the President’s Report. This report will also be published in the September 2011 issue of the Planetarian. Dave has been working on behalf of updating the status of IPS Affiliates and professionals for candidates to be eligible for integration with the current membership.
Exploring Earth’s Climate Engine

NARRATED BY LIAM NEESON
Affiliate Reports

Written Affiliate Reports were reviewed and Affiliate Representatives highlighted events and concerns from their respective reports. In news from the floor, there are still concerns that the threat of facility closure or shrinking budgets is continuing to be an issue globally. This issue will be discussed by Council during committee business.

ADSP Representative Chris Janssen reported that Eise Eisinga’s planetarium has been nominated for UNESCO’s World Heritage. This is the world’s oldest working planetarium (built between 1774-1781). They are seeking support for the nomination through letters. Chris will have an article in the Planetarian related to this item.

APLF Representative Agnes Acker reported on the upcoming project of the production for 2012 of an international planetarium show celebrating the 50th birthday of ESO.

RDP Representative Thomas Kraupe reported on efforts to forge a restructuring for a new organization of the German Speaking Planetarium. Formal recognition of the organization is expected in the fall of 2011.

GLPA Representative Jeanne Bishop reported on the efforts of the U.S. planetarium affiliates in supporting a document drafted by GLPA regarding the next generation of science standards as they relate to astronomy and planetariums. The document can be viewed by linking to the GLPA Website.

IAP Representative Loris Ramponi was present during part of the Council Meeting via SKYPE. He continues to maintain the IPS International Calendar and urges affiliates to send him their logos for inclusion on the website page.

JPA Representative Kaoru Kimura reported on the status of Japan’s planetariums following the earthquake/tsunami event. Our colleagues in Japan are appreciative of the many inquiries and offers of help that the planetarium community sent their way.

RPA Representative Zinaida P. Sitkova expressed her pleasure at attending the IPS Council Meeting in her own city and looks forward to having the IPS Council sharing the opportunity of meeting and collaborating with other members of the Russian Planetarium Society while we are here. SEPA Representative John Hare reported that SEPA offers grants to subsidize registration fees for their conferences: 10% of sponsorship fees go to a professional development fund which helps to promote those grants.

President Dave Weinrich announced that a new affiliate application has been received from the Chinese Planetarium Society. Dr. Jin Zhu, director of the Beijing Planetarium and president of the Chinese Planetarium Society, presented the documentation for the organization and answered questions from Council.

Affiliates were reminded to use the updated template to file their reports and include the affiliate logo on the IPS Affiliate webpage. The Affiliate Reports were filed.

Affiliate Reports not submitted: Association of Spanish Planetariums (APLE) Rocky Mountain Planetarium Association (RMPA)

Conferences

IPS 2010 Conference
Dr. Omar Fikry presented the final report on the IPS 2010 Conference in Alexandria, Egypt. Among the highlights of the report: • Participants from approximately 48 countries represented the global cultural diversity (327 participants) • Many first-time conference participants were from Africa and the Middle East • 26 vendors were represented • Evaluation feedback will be crucial in planning for future conferences Council congratulated Omar and the staff of Bibliotheca Alexandrina for a wonderful conference and appreciation for the hard work and dedication involved in such an undertaking. Council expressed special thanks to the volunteers and tour guides who made the conference so memorable. President Dave Weinrich noted that the entire planetarium community was watching the political events in Egypt unfold during the spring of 2011 and were kept aware of the status of the Bibliotheca as we received updates.

IPS 2012 Conference
Jon Elvert, Conference Host for the IPS 2012 Conference, presented an update of the budget and plans for the July 22-26, 2012 conference at the Irene Pennington Planetarium in Baton Rouge, Louisiana USA. President Dave Weinrich visited with Jon earlier this year to review the conference details. Updates included more information on details of the conference venue facilities for participants and vendors, post tours, and technical innovations such as live video streaming of conference activities (U-Stream: Hi Def). Information regarding the conference is posted on the conference website: ips2012.com, which can also be accessed through the IPS Website Conference page at www.ips-planetarium.org/events/conferences.html.

IPS 2014 Conference Bids
Following up on the initial bids presented in Alexandria, Egypt in 2010, Council heard the final presentations for three proposals for the IPS 2014 Conference:

1. Planetário do Rio de Janeiro, Rio de Janeiro, Brazil - presented by Dr. Alexandre Ceriman and Celso Cunha. Date: July 26-30, 2014
2. H.R. Macmillan Space Centre, Vancouver, British Columbia, Canada - presented by Robert Appleton. Date: June 27-July 2, 2014
3. Beijing Planetarium, Beijing, China - presented by Dr. Jin Zhu. Date: June 23-27, 2014

Council tabled the business of the actual vote for the Conference of 2014 until the day following these presentations. After considerable discussion and review of the 3 bids, Council voted to accept the Beijing bid for the 2014 IPS Conference. President Dave Weinrich thanked each of the potential hosts from IPS 2014, acknowledging the time and energy that goes into such an endeavor and urged Rio and Vancouver to consider a future bid.

The first day of the Council Meeting was adjourned at 5:40 pm.

The second day of the Council Meeting was called to order at 9:05 am on July 2, 2011.

Standing Committee Reports
Standing Committee Reports were presented, reviewed, and discussed. The full committee reports will be posted on the individual Committee Webpages on the IPS Website.

Awards Committee
Chair Lars Broman presented the IPS Awards Committee report. The list of candidates for IPS Fellows and the IPS Service Award was presented to Council for consideration. The President’s Award, the IPS Fellows, and the IPS Service Award honorees will be presented to the membership at the IPS Banquet during the IPS 2012 Conference in Baton Rouge. Chair Lars expressed concern that the guidelines/requirements for IPS Fellows were rather restrictive. After discussion among Council members, it was suggested that the Awards Committee should present changes for consideration to Council, perhaps including the IPS Fellow status as a prerequisite for Service Award nomination. Affiliates are encouraged to submit nominations for IPS Awards to the Awards Committee.

(Continues on Page 37)
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Sea Monsters
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Length: 40 minutes.
Transformed from giant-screen film by Sky-Skan.
Produced by National Geographic.
Transform coverage is truncated from fulldome.

Forces of Nature
Available in 2D and 3D stereo.
Length: 40 minutes.
Transformed from giant-screen film by Sky-Skan.
Produced by National Geographic and Graphic Films, Inc.
Transform coverage is truncated from fulldome.

Bugs!
Available in 2D and 3D stereo.
Length: 23 or 40 minute versions.
Transformed from giant-screen film by Sky-Skan.
Produced by Principal Large Format and SK Films.
Transform coverage is truncated from fulldome.
Elections Committee

Elections Committee Chair Martin George presented the IPS Elections Committee report. The last cycle of elections ran smoothly and the Committee is gearing up for the nominations process to begin for the next election. Affiliate Representatives are urged to encourage their membership to consider running for an IPS office. Martin and the committee will work on suggestions for increasing membership participation in the voting process.

Publications Committee

The IPS Publications Committee Chair Dale Smith Skyped in to present his report. Indications of the growing academic reputation of the *Planetarian*, under the editorship of Sharon Shanks, are: (1) authors may request that their articles be peer-reviewed, and (2) the *Planetarian* is entering an agreement with UNESCO Publishing for the *Planetarian* to be included in their database of academic and research journals.

Preparation of the next edition of the *IPS Directory* (which includes the *IPS Directory of the World’s Planetariums*—the “white pages”, and the *IPS Resource Directory*—the “yellow pages”) is progressing and distribution should take place later this year. Chair Dale Smith and Executive Editor Sharon Shanks proposed posting electronic versions of the *Planetarian* on the members-only area of the IPS Website at a more current level. Council agreed to posting the *Planetarian* back issues to within six months of the current issue (2 issues back).

Standing Committee Reports were filed.

Ad Hoc Committee Reports

Ad Hoc Committee Reports were presented, reviewed and discussed. Complete reports will be posted on the IPS Web Site Committee Pages.

Education Committee

The written Education Committee Report from Chair Jack Northrup was reviewed. The Committee continues to focus on updating links relating to Professional Development and on the U.S. national and state standards for science and astronomy.

Fulldome Committee

President Dave Weinrich reported that Antonio Pedrosa is the new chair of the committee and is busy in efforts to organize the committee. There was no report.

History Committee

Historian John Hare reported that his committee is making progress on completing the scanning of slides and photographs of archival material. Ian McLennan and Thomas Kraupe are working with John on the sub-committee for establishing a database of deceased IPS members and to create a digital memorial as a mechanism to recognize recently passed members.

International Relations Committee

Chair Martin George and his committee have been busy promoting IPS to those areas of the globe that are underrepresented and/or who have expressed interest in communicating with the planetarium community. Contacts and encouragement to our colleagues forged during the Alexandria Conference continue. An additional activity of the committee is aimed at gathering information from planetariums that have been affected by closures or risk of closure and studying the results of any actions that were taken.

Outreach Committee

Chair Jon Elvert presented the report on outreach efforts. Jon announced that production has begun on a planetarium presentation regarding space exploration in the post-Shuttle era. The fulldome digital show and a kiosk-related program will be distributed free to all planetarians attending the IPS 2012 conference. The committee continues to pursue partnerships and exchange of resources with other organizations. Chair Jon will participate in the annual ASTC meeting in Baltimore, MD (USA) in October to disseminate information on IPS programs, encourage IPS partnerships, and promote the IPS 2012 Conference.

Planetarium Development Group Committee

Council reviewed the written report submitted by Chair Ken Wilson. The completed chapters of the *Planetarium Guidebook* are posted on the IPS Web Site.

Portable Planetarium Committee

Chair Susan Button presented her report on the Portable Planetariums. Two new documents have been posted to the IPS Portable Planetarium Committee Web page: “Mobile Domes in Business,” which lists best practices for running a business with a portable planetarium; and “Portable Planetarium Domes,” which is a list of commercial portable planetarium domes currently on the market.

Work continues on production of a collection of planetarium lessons authored by U.S. educators from the “Week in Italy” Contest (1996-2010) for distribution to IPS members. Please contact the Committee for any news, photos, updates, corrections, and suggestions that would benefit the Portable Planetarium community.

Professional Services Committee

Chair Mike Murray—No report

Script Contest Committee

Chair Thomas Kraupe reported that the second announcement for the Contest was announced in the 2011 spring edition of the *Planetarian*. The Committee is preparing to sponsor a workshop on storytelling/script-writing at the 2012 IPS Conference. Thomas and Manos are encouraging the Affiliates to raise awareness and promote the contest among their regional memberships. The deadline for this contest cycle is December 31, 2011.

Strategic Planning Committee

Chair Tom Mason proposed that he pass the committee’s work over to the Officers to reevaluate the future issues that should be addressed by the committee.

Technology Committee

 Newly-appointed Chair Jack Dunn’s written report stated that the first article explaining downloading video from the Internet will be submitted to the *Planetarian* and posted on the Committee website. The committee will continue to seek ways to help make our planetarium colleagues’ professional lives easier in their daily use of technology outside of specific fulldome technology.

Web Committee

Chair Alan Gould’s written report addressed some of the progress on issues related to updating the content and redesign of the IPS Website. More interactivity related to individual committee pages, a Council page, and other membership-related developments will be a priority.

The Ad Hoc Committee Reports were filed. President Dave Weinrich commented that there would be some changes to goals and chair positions in some of the committees/positions within the next month or so.

Constitution Matters

Secretary Lee Ann Hennig reported that all revisions to the Standing Rules since the last Council Meeting were incorporated in the document and posted on the website following the 2010 Conference.

Unfinished Business

The Council reviewed the proposed revisions for the Conference Guidelines. The proposal will be posted on line for Council evaluation and comments in September; a second draft will then be discussed for approval.

Treasurer Shawn Laatsch presented a report on the cost/delegate for several of the latest IPS Conferences. Council’s review of past conferences is important in terms of conference (Continues on Page 38)
planning, analyses of bids, and evaluation of the conference process.

International Relations Committee Chair Martin George presented for Council approval of the Scholarship Application Form. *Tom Mason moved to accept the Scholarship Application Form as written, seconded by Mark Rigby and approved by Council.

The form will be posted on the IPS Web Site and in the Planetarian.

Secretary Lee Ann Henning will post the results of the IPS Membership Survey on the Council site and suggested that another survey be conducted within the next 2 years.

The “Planetariums at Risk” issue was discussed by Council. Committee Chair Martin George reviewed the proposed draft documents from the International Relations Committee concerning a policy/action statement for addressing the issue of IPS support for planetaria under threat of closure. One of the biggest issues is that IPS is not being notified when a planetarium is at risk, and the another issue is the challenge of collecting the facts regarding the circumstances of such conditions leading to a facility being placed at risk. The committee will make suggestions on how IPS can be made aware of these situations in a timely manner so that assistance/support can be offered. Again, Affiliate Representatives should pass this information on to their membership and communicate with IPS when situations arise regarding the risk of closure.

New Business

The Application for Affiliation from the Chinese Planetarium Society was reviewed. *Martin George moved to accept the application, seconded by Susan Button and approved by Council.

Shawn Laatsch informed Council that there is a proposal to produce and distribute a short (10-15 minutes) fulldome digital program in the form of a “trailer” relating to light pollution. This would be in conjunction with the IAU Meeting to be held in Beijing in 2012. Council directed Shawn to determine more details relating to the proposal and then report back to Council as soon as possible.

For the Good of the Order

President Dave Weinrich expressed thanks to the work of the Affiliate Representatives—they are the link between their members and IPS.

With business completed, Tom Mason moved to adjourn the meeting, seconded by Manos Kitsonas, and approved by Council.

Respectfully submitted,
Lee Ann A. Hennig
Executive Secretary, IPS
July 2, 2011

Installing audio/visual components

(How we do it, continued from Page 26)

for more ambient lighting, our situation with late afternoon sunlight. The bright images, plus shutters we plan to install, will improve viewing and also allow for a longer throw.

High contrast is also valuable. The higher it is, the darker the black will be. All planetarians know about the dreaded floating gray rectangle; that’s why CRT projectors became so popular. With CRT we could adjust for a true black. A contrast ratio of about 1000:1 will be pretty grey. 2000:1 will be better, but not black. Many better projectors can attain 20,000:1 with non-LED light sources now.

The mount is not super complex. It allows the projector to be hung from the ceiling so it is out of the way. Prices should range between $50 to $75. Things to check: how adjustable they are for how far down from the ceiling they hang, how they attach to any projector, and how much load they can carry.

Blu-ray players are pretty fancy now with most models in the $100-200 range. The Blu-ray standard is also designed to be upgradeable. It will be backwards compatible, but as new features are added to the Blu-ray discs, then a newer player will be needed. Most of the newest versions can handle BD-Video, which is video with a high bit rate audio, and 3-D content. 3-D requires a very high bit rate (data transfer rate) to handle the doubling of frames, along with the audio and much more.

Blu-ray players also will play regular DVD and CD discs, can handle USB devices, and have Ethernet connection. You can pay a little more ($50) and it will be wireless! This all means you can show photos and videos from a portable drive, connect to your home network, and, via the Internet, access YouTube and Netflix and watch movies and TV. You can, with a video camera, use Skype, for communicating. An SD card slot allows for storage and playback of online content related to Blu-ray movies. Updating the firmware is also possible to make sure you are up-to-date in internet-related software.

A note about Blu-ray players and how they connect to projectors: HDMI is the connection now used. This is a special plug that allows for digital video and audio to be transferred in one, small cable. But, with HDMI, the longer the line and the higher the initial data rate, the better quality (a high speed cable) it needs to be to avoid potential data loss. The limit for a long cable and a 1080 pixel signal is about 16 feet (5 meters).

Another fact I discovered about HDMI cables is that the video signal is only digital. That’s great, since that signal is the best possible. But our projector has a VGA connection, which is analog. I’ve heard that DVI and HDMI are the same, but actually they’re not. DVI is the current connection for computers to monitors and can handle both digital and analog. That is why simple adapters exist to convert DVI to VGA or vice-versa.

To convert HDMI to VGA, however, you need a converter box. This is a separate electronic device that does what your computer video card will do and cost approximately $50-$100. It took me about a week of searching online for an actual reason why converting...
Discover the Legend Written in the Stars...

LAMPS OF ATLANTIS

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The flooded walkway to the Saraburi planetarium made it impossible to reach the facility, effectively closing the planetarium’s activities for months.

**Contributed by Johan Gijsenbergs**

Bangkok

When the monsoon season hit Thailand a few months ago, no one could predict that a national disaster was in the making. A flood covering 23 of Thailand’s 76 provinces brought tragedy and misery to millions of people.

Two of the major planetariums in Thailand, at Saraburi and Rangsit, had to close for months due to the incoming water. The Saraburi planetarium, about two hours’ drive from Bangkok, is located on an island and they are a bit used to the water, but this year was extreme.

Most hit, however, was the planetarium at the Rangsit Science Center for Education, located about 50 km outside Bangkok.

The planetarium itself kept dry since it is a bit higher than its surroundings.

Because the Rangsit Science Center is a governmental institute, it quickly became a rescue camp for families. More than 1,000 people were brought in by military trucks to shelter at the science center. Instead of the stars, the focus of the planetarium staff turned to comforting their guests with food, care and a place to sleep.

The staff did a wonderful job for their flooded community and is well respected for their care.

Both planetariums kept dry from the inside, but, being surrounded by water, both had to close their doors.

By the beginning of December the water began receding slowly and cleanup operations began to bring back the facilities’ operations back to normal. The floods were devastating, but the disaster showed that a planetarium is part of society itself and can adapt to those needs with the same focus and determination as they do on a normal day.

The staff of the science center made a small movie of their situation during this time. You can find their story at youtu.be/CV3bWxCnp8U; it vividly shows what a critical situation they were in.

If you want to show your support as well, contact Prof. Panya Srikrjang from the Rangsit planetarium at pan2475@gmail.com. He is my hero of the year.
It has been an interesting school year so far. We started with our modified start-of-year activities, implemented the newly-adopted state science standards, and had a covert gathering of astronomy students in the school foyer to celebrate Lunar New Year with a mini-dragon dances.

However, the event that has caught most interest is the transit of Venus. My astronomy students are working on a few cross-curricular activities to promote information on the event.

- Graphical/Digital Arts: Creating web-friendly graphics and information on the transit, including safe observing procedures.
- Language Arts/Journalism: Preparing press releases about people's experiences observing the transit.
- Mathematics: Calculating the size of objects using limb darkening. (We seriously baked some fake numbers for this activity and I was not happy with its appearance so I am not making it available to the public yet.) A well put together resource lesson is www.transitofvenus.org/education/science-math/316-activity-pixel-count
- Astronomy: Recreating the transit using the planetarium and the fulldome system.

Some transit lesson ideas

I wanted to give you, as readers and planetarians, some ideas for different lessons to do for the transit. However, what if you live in parts of the world that will not see the transit, or what if it is a cloudy day? That lesson would have to be filed away until the next transit in 2117 (I know that when I am 139 years old, it will be very important for me to present that lesson to my students).

So, instead, I am focusing less on the topic of the transit and more on it as a tool of instruction.

My school district has been deploying an instructional method called “Gradual Release of Instruction,” and this triggered a smile from me afterwards and mentioned students moving their hands in little circles on the table, like they were polishing it. Never question the power of Mr. Miyagi.

I have worked with using this strategy can jump between monitor and independent transparently as a way to focus the student’s instruction.

Fun with moon phases

Do you know your waxings from your waning, or is there a difference in the last and third quarter moons? (I know that you know what is going on but, these are good starter questions to have for classes as they enter.)

When I know I have a group coming to visit that is going to be studying moon phases, I put up my poster from the original Karate Kid movie and reference Mr. Miyagi as a kinesthetic astronomy teacher, wax on with right hand and wax (replace as wane) off with left hand.

Unfortunately, students who have seen only the most current remake of the film saw this action for only a few seconds. So I made a little 45-second loop of Asian-inspired music and we “wax on” and “wane off” before the presentation.

I am fortunate that I get to have my students for an extended period of time and we integrated this into a larger activity, a small group multiple intelligences lesson. For this lesson, I let the students decide if they want to present the information on moon phases through actions, dance, song, poetry, prose, or art.

This year I have had several memorable interpretations of the moon phases through dance, using a variety of songs as the background, notably “Gotta Get Thru This” by Daniel Bedingfield, “Apache” by The Sugarhill Gang, and “Ride of the Valkyries” by Richard Wagner. We have a teacher with the last name Moon and he was asked by a group of students to provide the “man in the moon.” They did a stop-motion animation of his face going through the phases with the assistance of some dark construction paper.

A slogan on one group’s posters of moon phases that read “New Moon—is still the Old Moon just nothing is visible” done in graffiti style over other statements like “Old Moon kicked out of solar system.” “Bulb burned out in Moon, NASA concerned.” “Aliens steal the Moon—will return it for Bieber6 tickets.”

Did this work? Well, this January our eighth graders took the state science exam pre-test and one of the proctors came up to me afterwards and mentioned students moving their hands in little circles on the table, like they were polishing it. Never question the power of Mr. Miyagi.

1 The original 1984 movie starred Pat Morita as Mr. Miyagi and Ralph Macchio as the “kid.” The “wax on, wax off” was a hand-strengthened exercise that involved actually waxing a car.
2 2010, starring Jackie Chan and Jaden Smith
3 Justin Bieber, 1B, a Canadian pop singer, a current pre-teen heartthrob.
How did life on Earth begin? This tantalizing question forms the basis of the Morrison Planetarium’s most recent production, Life: A Cosmic Story. Narrated by Academy Award winner Jodie Foster, the show launches the audience on a journey through time, witnessing key events since the Big Bang that set the stage for life. Visualizations drive the narrative—from turbulent, star- and planet-forming giant molecular clouds to the microscopic activity of photosynthesis—in what the New York Times calls “a visually spectacular demonstration.” Named the 2011 Jackson Hole Wildlife Film Festival’s Best Fulldome Program.

Travel 120 light years to rediscover home!
Sigourney Weaver guides audiences on an immersive excursion that explores a Universe filled with the possibility of life. This visually rich program is grounded in observed data, with an evocative, multi-dimensional sound environment by renowned giant screen composer Michael Stearns. Develop a renewed appreciation for our fragile planet through the lens of astronomy.

For more information contact: Maral Papakhian 415 379 5127 domeshows@calacademy.org

For full-length previews of both shows visit: www.calacademy.org/domeshow username “d0mesh0ws” password “m0rris0n”
*use number “0” instead of letter “O.”
Fulldome standards: the dialog

As the number of digital dome theaters and the capabilities of systems both continue to evolve and to grow, de facto standards establish themselves.

IMERSA has been working to create formal standards that take de facto issues into account while also addressing gaps in meeting the needs of operators, producers, distributors, and audiences—with room to accommodate future growth and modification.

IMERSA’s working documents for establishing fulldome standards are headquartered online at www.imersa.org, and also posted at www.fulldome.com, for community review and feedback.

The process is being spearheaded by Ryan Wyatt of the California Academy of Sciences and Ed Lantz of Vortex Immersion Media. The group led a real-time discussion at the IMERSA Fulldome Summit in Denver in February, with a view to establishing an official IMERSA Standards Committee to take the process to the next stage.

Whether or not you attended the summit, you can join the standards dialog now on the web—and additional volunteers are also invited to step up to join the committee.

The Great Lakes Planetarium Association (GLPA) has communicated strong support of IMERSA’s efforts to move this process forward, with Daniel Tell (Roger B Chaffee Planetarium, Grand Rapids) participating in the summit as a GLPA representative.

Two premieres in Denver

On the schedule of screenings for the summit were two fulldome world premieres: Lamps of Atlantis and Dynamic Earth.

A co-production between Evans & Sutherland’s Digital Theater Productions and the Eugenides Foundation planetarium in Athens, Lamps of Atlantis explores the mythologies of Atlantis and investigates clues to the origin of the names of modern constellations that may have come from this mysterious civilization.

Dynamic Earth explores the inner workings of Earth’s climate engine. It is the result of collaboration between Spitz Creative Media, the Advanced Visualization Lab at the National Center for Supercomputing Applications (NCSA) at the University of Illinois, NASA’s Scientific Visualization Studio, the Denver Museum of Nature & Science, and Thomas Lucas Productions, Inc.

Other notable recent shows on the program included A Starry Tale (Kagaya Studio), The Wildest Weather in the Solar System (National Geographic) and Life: a Cosmic Story (California Academy of Sciences), which won Best Fulldome Program at the 2011 Jackson Hole Wildlife Film Festival.

Summit report pending

Did you join the fulldome community for the IMERSA 2012 Fulldome Summit? If not, watch for a report in the next issue of the Planetary. Organizers billed the event as a historic “conversation of convergence.”

The first summit was held in conjunction with the IPS meeting in 2008 in Chicago and the second in conjunction with the Jackson Hole Wildlife Symposium 2010 in Denver. In this third gathering, IMERSA has continued its practice of working closely with affiliate organizations with shared interests, cultivating speakers and participation from the Giant Screen Cinema Association, the Themed Entertainment Association, the Producers Guild of America, and the Great Lakes Planetarium Association.

On the program were seasoned pioneers such as Ian McLennan (project/planetarium consultant) and Jeffrey Kirsch (executive director of the Reuben H. Fleet Science Center), planetarium mainstays such as Mark Petersen of Loch Ness Productions, early adopters of fulldome such as George Wiktor of The GW Group, producer Valerie Johnson-Redrow and fulldome entrepreneur Markus Beyr.

This diverse mix of voices was set up to foster dialog between sectors and to continue pushing the creative and business potential. A series of tech sessions enabled fulldome system providers and tool developers to advance the conversation and awareness of what is possible.

Digital symposium “game changer”

The Digital Cinema Symposium at Galveston’s Moody Gardens, held January 9-10, 2012, was perceived as a game-changer in the giant screen industry. The event was sponsored by Barco, world-record holder for the brightest digital cinema projector, and museum cinema integrator D3D Cinema.

Highlights included a keynote talk by cinema pioneer Doug Trumbull, high frame-rate demonstrations in 3D, and demonstrations of (Continues on Page 46)
As Different as Black and White.

You asked for a brilliant night sky.
You wanted analog combined with digital.
You said the background should be truly BLACK.

We listened.
WE DELIVERED.

• Fiber optics introduced at IPS 1990.
• Analog-digital combination introduced at IPS 2006.
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• First combined powerdome®VELVET and Starball systems delivered in 2010.

VELVET is the only projector made to measure for the planetarium, delivering fulldome images with the unmatched dynamic range of 2,500,000 : 1. Fulldome at its best.
Barco’s Enhanced 4K DLP Cinema® 3D projection system for giant screen cinemas. Barco also demonstrated for the first time a new 55k lumen laser DLP video projection system that is currently under development, and their Auro-3D multi-channel three dimensional audio system.

The 4K digital projection demonstration included a split-screen shootout with 15-perf/70mm film projection. At the end of the demonstrations, the audience overwhelmingly voted digital the winner in an informal show of hands. Barco’s laser projector, presented on a 75-foot-wide unity gain screen, was also a hit. Attendees seemed to agree that the digital revolution of giant screen cinema has begun.

Group of advice expands

IMERSA is expanding its management team through ongoing recruitment of advisers. This group of industry veterans provides guidance and advice to the IMERSA board of directors without having to shoulder the full burden of a board member.

It includes
- Dina Benadon, vice chair, New Media Council, Producers Guild of America;
- Immersive attractions expert and entrepreneur Markus Beyr
- Mike Bruno, creative media director at Spitz Inc.
- Paul Fraser, president at Blaze Digital Cinema Works LLC
- Martin Howe, chief executive at Global Immersion
- John Jacobsen, White Oak Associates
- David McConville, creative director at Worldviews Network and co-founder and director of Noospheric Research at The Elumenati
- Mark Petersen, president of Loch Ness Productions; and
- Tammy Thurmon, executive director of the Giant Screen Cinema Association.

Upcoming events: 2012

March 15-17, TEA Summit & Thea Awards, Anaheim, California, USA

This two-day conference of the Themed Entertainment Association culminates with TEA’s Thea Awards Gala. The Thea Awards recognize excellence in the creation of compelling places and experiences.

This year’s Thea Award recipients include Arthur L’Adventure 4D at Futuroscope (a 4D experience in a digital dome), YOU! The Experience at the Museum of Science & Industry, Chicago (an educational exhibit with interactive digital components) and Disney’s Star Tours: The Adventures Continue (a refresh of the popular ride with new digital projection and gaming-style interactivity).

March 20-22, GSCA Film Expo 2012 & Dome Day, co-hosted by Euromax, Poitiers and Paris, France


April 18-20, 12th International Public Communication of Science & Technology Conference, Florence, Italy

Theme: “Quality, Honesty and Beauty in Science Communication.” Organized by the PCST International Network and hosted by Observa Science in Society, Fondazione Giannino Bassetti, Galileo Museum Florence and INAF National Institute for Astrophysics. Confirmed speakers include: Piero Angela (RAI, Italian Public TV), Felice Frankel (MIT), Helga Nowotny (president, European Research Council), Semir Zeki (University College London), Martin W. Bauer (LSE, editor of journal Public Understanding of Science), John Durant (MIT Museum of Science), Edna Einsiedel (University of Calgary), Bruce V Lewenstein (Cornell University); www.pcst2012.org.

April 29-May 2, American Association of Museums 2012 Annual Meeting & MuseumExpo, Minneapolis-Saint Paul, Minnesota, USA

Theme: Creative Community. New this year are sessions focused on career, management and leadership development. www.aam-us.org.

May 8-12, 6th FullDome Festival at the Jena Zeiss Planetarium, Jena, Germany


May 31-June 2, Es-site Annual Conference 2012, Toulouse, France

Theme: “Space and Time, Unlimited.” Professionals from science centers, natural history museums, universities, aquariums, zoos, research institutes and private companies will converge to discuss the hottest topics in science communication. The city’s famed Natural History Museum is a partner of this year’s conference. www.ecsite.eu

June 8-10, Produced By Conference, Los Angeles, California USA

Organized by the Producers Guild of America in association with International CES. Reaching across the film, television and new media industries, the conference is an educational forum that drew more than 2,000 participants last year. www.producersguild.org.

July 11-15, ESOF 2012: Euroscience Open Forum, Dublin, Ireland

Euroscience represents European scientists of all disciplines (natural sciences, mathematic, medical sciences, engineering, social sciences, humanities and the arts), from the business and industry sector, institutions of the public sector, universities and research institutes. ESOF is said to be Europe’s largest and most prestigious general science meeting and is held in a leading European city every two years. eso2012.org

September 5-7, Jackson Hole Wildlife Film Festival Symposium 2012, Denver, Colorado USA


September 18-21, GSCA International Conference, Trade Show & Dome Day, Sacramento and San Jose, California, USA


September 20-21, SATE Conference, Paris, France


October 13-16, ASTC 2012, Columbus, Ohio USA

Annual meeting of the Association of Science-Technology Centers. Theme: “Advancing the field of informal science education.” www.astc.org

Still from Arthur L’Adventure 4D, one of the recipients of a Thea Award at the TEA Summit in March. Courtesy Futuroscope, Poitiers, France.
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Digitarium systems are single fisheye lens systems for domes up to approximately 18m in diameter. They provide high quality, truly fulldome projection without the headaches of multi-projector systems or the quality compromises of spherical mirror systems.

Superior Support
We actively develop Nightshade®, the free open source planetarium software in our Digitarium systems. We maintain all of the system software so you don’t have to—it just works. Unique to Digitalis, software updates and technical support are free for the life of your system.

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No other systems on the market offer the same combination of usability, support, projection qualities and capabilities at such reasonable prices.
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At my latitude, 60° north, dusk is quite long, and in the middle of the winter—when I write this—also quite early in the afternoon. Thus, it has been a perfect time to teach my young grandchild Vincent (3 1/2) a little astronomy, pointing out for him the two brilliant planets while no stars are visible. However, his little sister, Claudia (1 1/2) protested. Pointing first at Venus and then at Jupiter she exclaimed “It’s a star! It’s a star!” I suppose I have to get back to the subject of planets versus stars when she is a bit older.

The International News column is built on contributions from IPS Affiliate Associations. If you have news that you want colleagues worldwide to read, please send them to your IPS representative (see page 3). Their deadlines are 1 April 2012 for Planetarian 2/2012 and 1 July for 2/2012. For more information, please contact philippe.adrian@planetarium-bretagne.fr.

For contributions to this International News column, I sincerely thank Agnès Ackner, Vadim Belov, Bart Benjamin, Ignacio Castro, Alex Delivorias, Jack Dunn, Line Visby Hansen, Aase Roland Jacobsen, John Hare, Nataliya Kovalenko, Thomas Kraupe, Loris Rampioni, Jenny Shipway, Mike Smith, Rachel Thompson, and Michele Wistisen. I wish you and other representatives back with news for upcoming Planetarian issues.

Association of French-Speaking Planetariums

Lhoumeau Sky-System (LSS) is a France-based planetarium vendor offering systems at low cost for small and medium planetariums. It consists of a very high quality video projector, an optical device with a classical optic, a diagonal mirror and a fisheye lens, a computer with a decent graphic card and a large hard drive, software allowing fisheye projection, and a remote control and a mouse for an easier control in the dark. See www.lss-planetariums.info.

To date, 82 LSS are working in the world: France 28, Spain 30, Italy 4, USA 3, two each in Portugal, Russia, and Africa, and one each in Australia, Belgium, UK, Netherlands, Switzerland, Poland, Canada, Mexico, Brasil, Philippines/Asia and India.

LSS training days are regularly organized by Lionel Ruiz and Yves Lhoumeau to introduce planetarium leaders and animators to full-dome video format and the educational uses of the system.

The 28th APLF Conference will be held at the Planetarium de Bretagne in Pleumeur-Bodou, (Côtes d’Armor, France), from 17 to 20 May 2012. For more information, please contact philippe.adrian@planetarium-bretagne.fr. Sky-Skan equipped this 20-m theater in 2010.

The 30-minute planetarium film $H_2O$: Our Story will be produced for the fall of 2012 by APLF in French, German and English, produced by Didier Grosjean (French Master-Films society, creator of The Future of Airbus). The show will benefit from the partnership of the European Southern Observatory (which celebrates its 50th birthday in 2012), and Hamburg Planetarium (Thomas Kraupe), and is realized with the help of private sponsorships.

The show will explore the depths of nebulae and stars, accompanying the astrophysicist Eva Luna through an attractive story devoted to water—the symbol of life—which is formed in the cosmos (H in the primordial universe, O in the cores of stars) and searched for on the surface of exoplanets.

The audience will discover in particular how the upcoming splendid European Extremely Large Telescope will be used to help us understand why and how everyone is connected to the cosmos, linking us to the greatest story of all times.

Inspired by the shape and function of insect eyes, the show will make use of the Panoptic camera for special 3D effects, a revolutionary piece of technology developed by the Electrical Engineering Institute at the École Polytechnique Fédérale de Lausanne in Switzerland. For information, see www.trendhunter.com/trends/panoptic-camera.

Short educational add-on modules created by Hamburg Planetarium will complement the show, allowing post-show live/real-time interaction with the public to develop and update some scientific questions and to lengthen the show experience. Hamburg Planetarium plans to also make the full-dome show scenes available in stereoscopic 3D.

A 15-year license (including VAT) is 47 €/seat; a kit for analog/opto-mecanical theaters is 32 €/seat; and the cost for portables is 633 € Special prices are proposed for APLF members and German planetariums. More information is available from agnes.acker@astro.unistra.fr.

Association of Italian Planetaria

In November, Simonetta Ercoli (Ignazio Danti Planetarium of Perugia) and an operator of Serafino Zani Astronomical Observatory conducted a laboratory together via Skype during the Perugia Science Fest.

The activity was for primary schools and consisted of creative experiences with the constellations as subject matter, using poor, recycled and salvaged material.
3. A group of three children were given a sheet of paper with buttons representing a constellation. They had to draw the figure on a sheet of paper and then had to find the constellation on the poster map. All the children drew the constellation correctly and then found it.

Other experiences via Skype are being organized in the coming months, one involving the young members of the group Astro-mome managed by Planetarium-Observatory of Laval (France) and during the next Day of Planetaria (March 18).

To participate in the Day of Planetaria (www.dayofplanetaria.org) is very easy. Perugia Planetarium and Lumezzane Planetarium and Observatory invite planetariums that will be open on Sunday 18 March to join the day and to collaborate with Italian planetariums.

In Perugia and Lumezzane, for example, during the public programs, images of planetariums from around the world are shown. In fact, a short continuous presentation is run in the planetarium hall.

To participate in this slideshow, please send your logo, a photo of the building, the program for the day, and a short paragraph about a particular point, e.g., the reason for the planetarium's name.

Send the materials to osservatorio@serafinozani.it. There possibly will be organized experiences via Skype (See many examples of constellation drawing at the end of the page www.astrophilibresciani.it/Scienza_a_Scuola/Inventa_Costellall/Inventa_Costellazioni.htm.)

4. A group of three children were given a sheet of paper where there were some points representing the brightest stars of a constellation. Then they had to name the drawing and at the end had to find the real constellation on the map. They showed their creative drawings to the Brescia operator through webcam via Skype. (See many examples of constellation drawing at the end of the page www.astrophilibresciani.it/Scienza_a_Scuola/Inventa_Costellall/Inventa_Costellazioni.htm.)

The operator who conducted the laboratory from Brescia sometime used webcam like a small puppet theater, and Simonetta Ercoli supported him in Perugia. The laboratory consisted of four main steps:

1. Every child had to make a creative picture on a sheet of paper where there were some points representing the brightest stars of a constellation. They then had to name the drawing and at the end had to find the real constellation on the map. They showed their creative drawings to the Brescia operator through webcam via Skype. (See many examples of constellation drawing at the end of the page www.astrophilibresciani.it/Scienza_a_Scuola/Inventa_Costellall/Inventa_Costellazioni.htm.)
2. A group of three children had to find the constellations drawn on three transparent yogurt container lids on the map.
3. A group of three children were given a blank map with two highlighted constellations. They had to draw the figure on a sheet of paper and then had to find the constellation on the poster map.
4. A group of three children were given a sheet of paper with buttons representing a constellation. They had to draw the figure on a sheet of paper and then had to find the constellation on the poster map. All the children drew the constellation correctly and then found it.

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the process of taking over the affiliation and the IPS Council seat from RDP (Council of German Planetaria).

This will be official as soon as IPS Council has reviewed the documents and agreed, which will assure continuity and a broader access for those interested in planetariums in German-speaking areas. The official address of this new Society is: GDP, Gesellschaft Deutschsprachiger Planetarien, c/o Zeiss-Großplanetarium, Prenzlauer Allee, D-10405 Berlin, Germany. The email is info@gdp-planetarium.org.

The first GDP Conference will happen on 5-7 May 2012 at Planetarium Wolfsburg. The conference website is under development at gdp.planetarium-wolfsburg.de.

In October 2011, the Zeiss-Planetarium Jena, the longest operating planetarium in the world, replaced its ADLIP Fulldome Lasersystem with a VELVET System from Carl Zeiss Jena. Eight digital projectors now work as supplement to the optomechanical star projector UNIVERSARUM.

During 8-12 May 2012, right after the GDP Conference in Wolfsburg, Jena planetarium will host again a Fulldome Festival. Please find details at www.fulldome-festival.de.

The ongoing cooperation between Planetarium Hamburg and the University of Applied Sciences of the city of Lübeck in the field of information technology and design has led to a great achievement.

The master’s thesis of Axel Meyer was awarded with the esteemed Possehl Engineer Award. He developed an iPhone app working with the E&S Digistar fulldome system of the planetarium that now allows more than 200 players to individually and simultaneously control and interact with objects on the dome using their smartphones or iPads. This unique multi-user interactivity will now be developed further in close cooperation between Hamburg and Lübeck for future use in other theaters.

In Vienna, Peter Habison, former director at Vienna Planetarium, has taken over new responsibilities for astronomy and space activities at the Natural History Museum.

On 11 February, Wilhelm Foerster Observatory/Planetarium in Berlin celebrated the 90th birthday of its former long-term planetarium director, Adolph Kunert, who also is quite well-known for his successful work in the international planetarium community.

European/Mediterranean Planetarium Association

Wednesday 7 December 2011 was a special day for the Eugenides Planetarium in Athens. Marine conservationist Pierre-Yves Cousteau, the son of legendary underwater explorer and filmmaker Jacques-Yves Cousteau, introduced to a packed audience his Secrets of the Mediterranean: Cousteau’s Lost World, a 45-minute documentary created in collaboration with marine ecologist Enric Sala for National Geographic, to commemorate the centennial of Jacques-Yves Cousteau’s birth.

Secrets of the Mediterranean attempts to assess the health of the Mediterranean today by comparing historical footage from Cousteau’s earliest exploration of the Mediterranean Sea to that filmed by his son and Enric Sala.

In November, the Eugenides Foundation and the Chamber of Fine Arts of Greece organised a two-day symposium on Art-Science-Universes. The symposium, which was open to the public, included presentations by eminent scientists, historians of art and philosophers, as well as Russian cosmonaut Yfodor Yurchikhin.

Finally, the Eugenides Planetarium celebrated the 2011 winter solstice with the screening of its latest production, The Long Night, to the backdrop of live musical improvisations by composer Dimitri Papadimitriou. The Long Night is a visual 40-minute tour of the universe from the night sky to the furthest reaches of space.

Further north, in the Greek city of Thessaloniki, the Noesis Science Center and Technology Museum hosted CERN’s new Accelerating Science traveling exhibition, designed to communicate the basic principles of particle physics, the fundamental questions it raises and the research tools used, namely the Large Hadron Collider and experiments. The exhibition was open to the public in October.

In November, Noesis and the French Academy of Thessaloniki, in collaboration with Kalendi Editions and Janos Bookstore, invited French astrophysicist Christophe Galfard for a presentation of the different physical phenomena related to the sky, the sun and Earth’s atmosphere. His talk, “From the birth of the stars to the clouds in the sky: a cosmic voyage for understanding the climate” was enthusiastically received by the audience, who peppered Galfard with questions long after the end of his presentation.

In November, Noesis presented a collection of stunning space photographs taken by Russian cosmonaut Yfodor Yurchikhin, who captivated his audience with his storytelling of his experiences during several space missions.

The Astronomical Centre Rijeka, Croatia introduced some novelties in its regular program for 2012. The first trimester was dedicated to the presentation Kauloka’Hina for the youngest and wide public. Also shown was The Sky Beneath Us, the new live presentation
dedicated to the south night sky tailored for all age groups.

For kindergartens and schools, a new exhibition of their works dedicated to the solar system and astronautics was organized within a thematic winning competition.

From January to April, the Astronomical Centre Rijeka organized and is hosting popular manifestations intended for a broader audience, including a “Night of the Museums,” International Planetarium Day and a science festival. For the second time ever, the Centre celebrated Dark-Sky Week and World Space Week by introducing special week-long programs that included live presentations, concerts, exhibitions and lectures.

Great Lakes Planetarium Association

Illinois. From late-January through May, Lakeview Museum Planetarium is presenting the Burke Baker Planetarium's The Dinosaur Prophecy in conjunction with the museum exhibit “Be the Dinosaur.” Construction of the new Peoria Riverfront Museum is speeding along. The planetarium will close on 16 July 2012 to move the Zeiss Powerdome planetarium system to the new building.

The William M. Staerkel Planetarium at Parkland College in Champaign recently hosted a very successful GLPA conference. In addition to their regular public offerings, Parkland College also hosted the Science Olympiad regionals, plus a special Science Night for Head Start children and their families.

The Cernan Earth and Space Center of Triton College in River Grove presented its annual holiday show Celebrations of Winter and the Winter Wonderlight laser light show in December. In January, the Cernan Center staff premiered a trio of “mini shows,” including their own presentation titled Mars 2012.

Indiana. The P-H-M Digital Video Theater in Mishawaka and the University of Notre Dame's DVT plan to offer a wide variety of events and activities to make the Michigan-Indiana border area a destination for Transit of Venus enthusiasts. Also, Art Klinger reports that their planetarium’s renovation was completed in January.

The Ball State University Planetarium, Muncie, has completed the process of removing slide projectors from the dome. The planetarium now uses six high-definition video projectors.

B.J. Harper (retired director of the Northrop High School Planetarium, Fort Wayne) recently traveled to the British Isles to pursue her passion of archaeoastronomy. Harper was a recent presenter at the combined annual conference of the Detroit area math and science teachers, where she made three presentations on the archeoastronomy of the British Isles.

Michigan. The Robinson Planetarium and Observatory in south-central Michigan has begun a remodeling program.

The Kalamazoo Valley Museum Planetarium recently offered Invaders of Mars as its feature show, along with their stargazing show Orion Nights and family show Sky Legends of the Three Fires. Production is currently underway for a show that details the transit of Venus and the eclipses of 2012.

The Abrams Planetarium is currently running its locally-produced show Relics of the Big Bang, which describes the research that MSU physicists are doing to look for the Higgs boson and the dark matter particle.

The Upton Planetarium in St. Joseph recently hosted a very successful community night, with 75 in attendance. For a facility with only 55 seats, it was a very full house. The staff is also working on organizing a transit of Venus event in June.

The recently renamed University of Michigan Museum of Natural History Planetarium in Ann Arbor (formerly the Exhibit Museum) will be going micro. As part of a temporary exhibit about mites and other small things, the planetarium plans to host Nanocam: A Trip into Biodiversity.

The Roger B. Chaffee Planetarium in Grand Rapids is hosting Facing Mars, an interactive exhibit looking at the challenges that will be faced by explorers of the red planet. The exhibit will be accompanied by the planetarium show Our Bodies in Space and special events in the museum.

Over in the Motor City, the staff of the Dassault Systèmes Planetarium has been experiencing some unscheduled time off, due to the closure of the Detroit Science Center. This closure is the result of a severe financial crisis. No date has yet been announced for its re-opening.

In January, the Delta College Planetarium collaborated with the Midland Center for the Arts on a new exhibit called Giant Worlds, which concerns the giant planets in our solar system. There was also a joint scout program dealing with the exhibit and shows.

The Kingman Museum has partnered with an animation class at Kellogg Community College to create short artistic videos that will be shown in the planetarium prior to their feature presentations.

Ohio. The University of Toledo’s Ritter Planetarium had its grand re-opening on 29 October after a five-month shutdown for renovation. Over 800 people attended eight full-house presentations featuring the world’s first SciDome XD system from Spitz.

Wayne Kriynovich is the new planetarium director at the Schuele Planetarium at the Lake Erie Nature and Science Center in Bay Village.

Suzie Dills, formerly at Schuele Planetarium, is the new executive director of the International Women’s Air & Space Museum. IWASM is a free museum whose mission is to preserve the history of women in aviation and space by documenting their past, present, and future contributions.

Jay Reynolds, also formerly at Schuele, is now director of the Lakeland Astronomical Observatory at Lakeland Community College.

Scott Oldfield reports that the Vandalia-Butler Planetarium at Smith Middle School hosted a very successful International Observe the Moon Night event. Also, the dome hosted a geometry class to calculate the square degrees of sky covered by the various astronomical asterisms.

The Bowling Green State University Planetarium recently ran Fall Fest 2011, which featured a series of programs on astronomy in various countries and cultures around the world.

The Ward Beecher Planetarium in Youngstown is busy producing a faculty research full-dome program called Cosmic Castaways, about gravitationally-expelled extragalactic stars, and a program on celestial motions for all the fifth graders in the Youngstown City School District. The dome hosted nearly 1,000 people for its First Night program, proving again to be one of the city’s more popular activities on New Year’s Eve.
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Wisconsin/Minnesota. The University of Wisconsin-LaCrosse Planetarium saw the return of Bob Allen as director this fall after a five-year hiatus. Among other things, Allen brought back monthly planetarium programs and weekly laser and light shows, both of which had been discontinued in 2009 because of budget cuts.

The UW-Milwaukee Manfred Olson Planetarium celebrated the longest night of the year with a special program called Winter Solstice. In January, Odyssey Under the Stars described the astronomical connections in Homer’s Odyssey with storytelling, song, and stargazing.

In January, the Charles Horwitz Planetarium in Waukesha presented Skylase laser programs for Waukesha’s Winter Jan-Boree Festival. In February, their public program was an in-house program titled Legends of the Winter Sky.

The Minnesota Planetarium Society and the University of Minnesota’s Bell Museum of Natural History recently agreed to integrate their programming and operations at the Bell Museum. The Bell Museum intends to operate the ExploraDome program in a similar fashion as before, with little or no disruption in service.

Great Plains Planetarium Association

GPPA members had a great time at the Western Alliance Conference in Killeen, Texas in July. One group visited the Space X test facility in McAllister, Texas. Private initiatives are opening new dimensions for human spaceflight and the group was impressed with the enthusiasm and “can do spirit” of the Space X employees.

Participants expressed thanks to WAC 2011 hosts Chuck Rau and Fred Chavez for a great accommodations and lots of fun experiences in the dome.

Meanwhile, Jack Northrup’s middle school students at King Middle School Planetarium in Omaha continue to enjoy their new render farm and work on Blender projects.

At Mueller Planetarium in Lincoln, the planetarium is working with both the nanotechnology researchers in physics and now with University of Nebraska-Lincoln first-in-the-nation Space Law graduate program (part of the College of Law College)

In 2012 there will not be a separate WAC, as the four regions voted to encourage everyone to go to Baton Rouge for IPS 2012.

Middle Atlantic Planetarium Society

The 2012 MAPS conference will be hosted by Gloria Villalobos at the newly-renovated Novins Planetarium Sky Theater at Ocean County College in Toms River, New Jersey. The planetarium features a Zeiss ZKP4 fiber optic star projector combined with a Digistar 4 SP2HD digital system. Dates for this event are 16-19 May. The conference hotel will be the Toms River Holiday Inn just 10 minutes from the planetarium. More details are available on the MAPS website, www.mapsplanetarium.org.

Dennis Herrmann and the Kent County High School Planetarium with its Spitz A3P instrument in Morton, Maryland, presented its 25th annual Christmas program for the school and the public communities. From the holiday program’s first days in 1987, when it was recorded on reel-to-reel tape and used several 35 mm carousel slide projectors, it has gone completely digital during the last two years and included video images this year for the first time. The planetariums has the advantage of producing shows with radio station WKHS-FM, located in their school.

The show is the result of a collaboration of the high school students in astronomy and the broadcasting students in the radio program.

In November, MAPS members Francine Jackson (University of Rhode Island Planetarium, Providence) and Mike Smith (North Museum Planetarium, Lancaster, Pennsylvania) attended NASA’s National Mars Education Conference.

Included with the conference was the launch of the Mars Science Laboratory, which educators viewed from the Operation Support Building-1, right beside the Vehicle Assembly Building.

The conference’s main focus was to provide formal and informal educators new tools to integrate mission-related activities. Educators got to plan their own mission, even with budget cutbacks and rocket failures, select a landing site, and compare imagery and rock analysis.

Princeton University is seeking nominations from secondary level (grades 7-12) schools throughout New Jersey to recognize a Distinguished Teacher. The annual award is $5,000 for the educator, and $3,000 towards books for that teacher’s school. Lenape Valley Regional High School in Stanhope has nominated MAPS Education Committee Chairperson John Scala for this honor. The final decision from Princeton will be announced in June.

The Hamilton Planetarium Scholarship Fund Inc., based within the MAPS region, gave out two scholarships in its first year of operation. The fund’s goal is to encourage and aid students who are interested in entering the planetarium field as a career.

The first two recipients were Sean Reid, a senior at SUNY New Paltz, and Christopher Karlic, a sophomore at Youngstown State University in Ohio. Applications for a scholarship may be submitted at any time, and may be found, along with other information, at the...
the ages of 10 and 14 attended the Astroskole, approach to these speculations. Children, and astrobiology offers a scientific of extraterrestrial life are very popular among of this first Astroskole because speculations size the connection to the planetarium.

Nordic Planetarium Association

In 2011, Orion Planetarium in Jels, Denmark had the opportunity to realize a long-time aspiration of establishing a summer school. It was the intention that the summer school was to supplement normal primary school services, and give children with special interest in science a week-long experience within a selected subject. The 5-day summer school was named Astroskole (“Astroschool”) to emphasize the connection to the planetarium.

Astrobiology was chosen to be the subject of this first Astroskole because speculations of extraterrestrial life are very popular among children, and astrobiology offers a scientific approach to these speculations.

Twenty enthusiastic girls and boys between the ages of 10 and 14 attended the Astroskole, which was held the last week of June. Every morning started under the dome, where the children received an introduction to the topic of the day in a specially-designed and interactive show.

The week’s program contained discussions of characteristics of life, studies of extremophiles and their biotopes, calculations and estimations of the likelihood to find life on exoplanets, and construction of models of the probes we used to explore the solar system. Each day’s activities were supplemented with physical activities or experiments such as launching water rockets, playing telescopic ballgames, registering sun spots and studying cells and cell compartments in microscopes.

One of the highlights of the week was a visit to a local clay pit, where remnants of prehistoric whales are trapped in the clay. Digging in the clay at the bottom of the pit and walking on a surrounding evolutionary path, where each step corresponds to 1 million year, enhanced the children’s understanding of how life on Earth evolved and supported the imagination of how life on another planet could evolve.

Underlying the education of the week was to give the Astroskole attendees an opportunity to touch, play and experiment with astrobiological themes, a concept supported by a specially-designed science show (by Physics Shows at Aarhus University) demonstrating the environment in space and circumstances in relation to spaceflight.

To conclude the week, the pupils created their own planetarium show about Mars geology and exploration. (Full story on page 22.)
selves along a 1:1 billion scale model of the solar system and, surprisingly, many took the whole 4.5 km route and back. Later in the day, children could accompany Rytmerita, a princess from Venus, who could sing and dance with them.

A series of lectures followed during the evening with themes covering mainly modern astronomy with connections to the Institute of Physics and Astronomy at the University of Aarhus.

In addition to this, a new book covering much of the history of the observatory was launched (available in Danish only, at Dkr 120 plus postage). More information available from Ole J. Knudsen, ojk@siau.dk.

The planetarium in Lund (Lund University, Sweden) is in the process of upgrading equipment. The staff has been working hard on the procurement documents, and they have agreed that they are ready to go public with the invitation to tender.

The planetarium currently has an opto-mechanical GOTO projector that is closing in on 35 years in use and is ready to retire. They are looking for someone to provide them with new top-of-the-line equipment to replace the old projector. More information available from Anna S. Árnadóttir, anna.arnadottir@vattenhallen.lth.se.

Per Broman moved in January from Dalarna to Sweden’s southernmost region, Skåne, with both his company, Broman Planetarium, and his science center, Backyard Cosmos (including its 5 m planetarium), which will be dismantled and put in storage until he finds a new place to set it up. More information available from pbr@planetarium.se.

**Rocky Mountain Planetarium Association**

In November 2010, the Clark Planetarium in Salt Lake City went through some major changes. Its 3D IMAX Theater was upgraded with digital projectors, a new sound system, screen and seats. This, combined with an agreement with the Larry Miller Megaplex theater complex next door, now allows them to play Hollywood films in their IMAX Theater in the evenings.

After 8 years of trying to find attractive content for that theater in the evening hours, the Clark Planetarium staff is happy to report that the Hollywood films are doing well. Films like TRON, Harry Potter, Born to Be Wild and Pirates of the Caribbean (all in 3D) have been huge hits. Their daytime shows (science, nature and adventure films) continue to draw well from the public and schools. This combination has provided an improved business plan for their IMAX Theater so it can better support the planetarium’s overall mission.

The next big improvement took place with the Hansen Dome Theatre in September 2011. The 168-m dome was cleaned and painted, and they upgraded from Evans & Sutherland’s Digistar 3 to Digistar 4. This advancement also meant new projectors, moving from the previous 6-projector DLP system to a 2-projector JVC system.

This not only increased their projected resolution (3200 to 4096 pixels), but also allowed them to run fulldome video playback at 60 frames per second. Rendering and production capabilities were also improved to give them that output ability.

After surveying locally and around the country, it turned out that the most demanded music entertainment show (next to Pink Floyd) is still Led Zeppelin. As a result, an unprecedented amount of effort went into the making of this show. The performances opened to packed crowds and rave reviews last spring. Each song has its own specific theme, sometimes nostalgic to the Led Zeppelin time period, sometimes abstract, but definitely with more environmental themes and scenery than anything the Clark has done before.

Speaking of music entertainment, the Clark show distribution staff has compiled a “build your own” library of fulldome video sequences from virtually all of their original shows released since 2003. More than 3 hours of astronomy and space-based content and 4 hours of art and entertainment-based sequences are now available.

This fulldome video library joins Alternative X, a presenter-controlled music library. More information can be found at www.clarkplanetarium.org/distribution.

Even though The Secret of the Cardboard Rocket continues as one of their most popular fulldome shows, the Clark production group is finishing work on a new planets show geared for the same target audience: preschool through 4th grade and their families.

Called Perfect Little Planet, it is a grand tour of our solar system by an alien family in search of the best vacation spot. The show features character voices, scene construction in a full 4k resolution environment, and even small sections of character animation. This show will be the planetarium’s first feature show available at both 30 and 60 frames per second. Trailers and sample images from the show can be viewed on the distribution website.

**Russian Planetarium Association**

The planetarium in Astrakhan, opened in 1959 but closed several years ago, is now back and has resumed its work as the Department of Astrakhan Construction Engineering Institute.

The dome there is 5 m (17 ft), and it includes an exhibition hall, lecture hall, classrooms, library and telescope. The roofing has become an observation deck. During the three autumn months, about 3,000 people have visited the planetarium.

The planetarium in Izhevsk, the capital of Udmurtia, also has renewed its work. The planetarium has a 6-m (20-ft) dome. It also includes two portable planetariums with domes of 4 and 5 m (13 and 17 ft) for work outside the planetarium.

To organize all that, A. Khlebov and V. Chumakov (previously leaders of the astronomy study group and astronomy club of the city of Izhevsk) established a limited liability company. Nowadays the company rents accommodations in the municipal exhibition center. Being an official partner of the Society of Spherical Cinema, the company came into agreement with the municipality about carrying out the presentation of the stationary planetarium.

There will be further talks about providing accommodation for this stationary planetarium.

Z. Sitkova, Nizhny Novgorod Planetarium, participated recently in the XI Ukrainian Conference on Space Research at the Centre of
Academy since 1999, the third of the laboratory departments (the first two being space and physical).

The planetarium owns a huge collection of telescopes, which were made by the Novosibirsk Instrument-Making Plant. Due to collaboration with this plant since 2006, the Siberian astronomical forum takes place in the country camp.

Construction is now underway in Novosibirsk on a new science education complex, the first stage of which is a complex astronomical observatory with a new planetarium and exposition facility, a Foucault tower, and astronomical and astrophysical sites.

A museum, library and restaurant complex is stage two, and for stage three, a polytechnic museum, large exhibit hall, and outdoor exposition area. The 309-million-ruble construction cost is coming from municipal, regional and federal sources.

For the Perm Planetarium, the culmination and one of the most important events of the year of Russian space travel science became the meeting with the famous pilot-cosmonaut G. Grechko in October.

There were so many people who wanted to meet the cosmonaut that organizers of the meeting had to broadcast the proceedings to the lobby. Talking about his work in space, Grechko demonstrated to the audience the photos which were taken by him. It turned out that every photo keeps within it separate story, which he gladly shared with the audience.

Veterans of cosmic branch, students, pupils from the School of Young Astronomers and children from the club Young Cosmonaut were present at that meeting.

During the days of the 100th anniversary of Volga State Social-Humanitarian Academy (previously the Pedagogical Institute), A. Cherepashuk visited his home town of Samara where, many years ago, he was a student.

Being a pupil at school he was carried away by astronomy, and later became an amateur astronomer and was making telescopes. Nowadays he is a member of the Russian Academy of Sciences, the principal of the Sternberg State Astronomy Institute, vice-president of the European Astronomy Society, a member of the Royal Astronomy Society (of Great Britain) and laureate of several awards.

The meeting of Cherepashuk and the pupils of the forth form of the society of young astronauts Alkor took place in October in the planetarium. Since 1994, pupils of that school have a two-year course of astronomy (in third and fourth forms) based on the program of teacher E. Medvedeva. This course has been successfully run for eight years.

In Saint Petersburg, on the Day of Astronautics in April, the first school interactive planetarium in Russia opened in School #143. The equipment of the planetarium creates the feeling of being inside the image. Pupils can become pilots of space ships there and, from the cabin, look at space rockets, space stations, moon crater maps, the sun and many other things. A meteorite almost collides with the space ship, and children can hear the sounds of the working machines and voices from mission control. All the school desks have control panels and a monitor that allows pupils to do different quizzes.

Southeastern Planetarium Association

The 2012 SEPA conference will take place in Baton Rouge, Louisiana immediately prior to, and during, the 2012 IPS conference. The IPS conference gets underway on 22 July with a welcome reception. SEPA will hold a banquet the evening before, with paper sessions on July 22 and a business meeting on 26 July.

SEPA has arranged for a block of rooms at the Belle of Baton Rouge Hotel, at the discounted IPS rate of $119 for single or double occupancy.

Because of generous vendor support and a healthy bottom line, SEPA will cover the cost of the banquet and paper sessions. Delegates will be responsible for their own hotel charges. Limited, additional monetary support is expected for “full” SEPA members (those who work within the defined SEPA region). Details are posted on the SEPA website at sepadomes.org.

Southwestern Association of Planetariums

This quarter SWAP has good news to share! The John C. Pogue Planetarium of Grand Prairie, Texas is getting a new look. In early January the school board authorized an upgrade and renovation.

Architects’ designs include a new entrance, additional interior walls, new enclosure and work desk, projection cover structure, carpet, and guest seating. The dome is to be cleaned and repainted with 45% gray reflectivity paint and new LED cove lighting will be installed.

The planetarium will feature a MediaGlobe III digital planetarium and lifter system. Plans
12, the planetarium invited teachers of astronomy from 150 schools in Dnepropetrovsk for a meeting. Teachers got acquainted with new programs of the planetarium, participated in a game training, and developed a schedule of monthly lectures helpful for teachers. So now, once every month, teachers of astronomy come to planetarium to get the complete information on different astronomy topics to share with their pupils.

Another important event at the Dnepropetrovsk Planetarium took place in November, when a new movie devoted to the life and activities of cosmonauts founder Konstantin Tsiolkovskiy was shown for the first time in planetarium. The movie was created by the Ukrainian production company Signal Red.

In preparation for 2012, the program What about prophecies are silent was created by Dnepropetrovsk Planetarium, which is very popular among public.

For the past three years, Donetsk Planetarium has been digital. Having had the opportunity to show fulldome programs, the planetarium started creating its own fulldome shows. Nowadays two studios work in the planetarium, one to develop shows with the astronomical simulator, and the other to develop shows based on fulldome 3D video graphics.

Having created its first CIS-territory fulldome movie for children How the Moon went as a guest to the Sun, the Donetsk Planetarium is finishing work on the show Air Ghosts.

Demonstrations with new technologies have attracted the attention of thousands visitors from Donetsk city and region, as well as the Lugansk and Zaporozje regions. Although the main audiences traditionally have been children, now also more adults and more excursions from different cities of Ukraine are in the audience.

On 1 January 2012 was the 60th anniversary of Kyiv Planetarium, the oldest one in Ukraine. The initiative of its creation belonged to well-known Soviet astronomer and professor of Kyiv University Sergiy Vsekhsvyatskiy. Now the planetarium director is Klim Churyumov, also a widely-known cometary scientist and professor of astronomy, who was years ago a student of Vsekhsvyatskiy.

All these 60 years, the planetarium has delivered lectures on astronomy and geography topics, and demonstrated the starry sky. Nowadays the planetarium repertoire consists of over 100 different programs, both lectures and shows, for different age audience.

Fulldome cinema from the scientific/cultural/entertaining center AtmaSphera started to work in the stellar hall of Kyiv Planetarium in December, and a game zone appeared, where visitors can get rid of space invaders’ attacks and asteroid danger, and get acquainted with the solar system. AtmaSphera has transformed the interior of the jubilee planetarium into a modern, futuristic design.

So nowadays in the planetarium building, visitors can benefit from modern technologies of visualisation, watch fulldome movies (Kaluoka’hina, Natural Selection, Dawn of the Space Age, Realm of Light), as well as benefit from an almost real starry sky during classical planetarium programs using the opto-mechanical Big Zeiss star projector.

include a new projector control computer with dual monitors and an offline work station. The planetarium will use the remainder of the school year to prepare for a late summer installation.

Ukrainian Planetariums Association
In 2011 Dnepropetrovsk Planetarium started collaboration with teachers of astronomy. For several years astronomy has been excluded form school curriculum. Experienced teachers retired during these years, and new teachers don’t possess the necessary level of astronomy preparation.

At the beginning of the school year 2011-
A life in science communication

Retirement of one of Thailand’s leading lights

By Martin George
martingeorge3@hotmail.com

Last September saw the retirement of Salin Weerabutra, director of the National Science Centre for Education in Bangkok. For many years Salin was director of the Bangkok Planetarium—a major attraction within the centre—and continued to oversee its operation until her retirement.

Over very many years, Salin has been our main IPS contact in Thailand and has kept the IPS, especially through the International Relations Committee, informed of developments in the country.

Salin began her 36-year career at the science centre in 1976. This suited her wonderfully, as she had a special interest in science and had majored in mathematics. At that stage her role was classed as a government officer under the Thai Ministry of Education, but by 1994 she was appointed to be the head of the Bangkok Planetarium, a prominent building which occupies a large area within the centre, several kilometres east of central Bangkok off Sukhumvit Road.

I first met Salin in 1996 when she attended the IPS conference in Osaka. She was very keen on the exchange of ideas among planetarians and I, and other IPS members, had many discussions with her in Japan. This began a long friendship which I am sure will continue well into Salin’s much-deserved time for herself.

Especially once she had become head of the planetarium, Salin was always keen to make improvements, updating the shows and even at one stage having the entire dome painted from the outside, making it look like a huge globe of the Earth complete with clouds.

Travelling on the Sukhumvit line of Bangkok’s famous Skytrain (the elevated railway), one can see the unmistakable dome clearly. She was also a driving force behind new exhibitions and science week activities.

Science week in Thailand commemorates the wonderful effort put in by King Rama IV in 1868 to observe the total solar eclipse on August 18 that year from a place called Wah Kor, near Prachuap Khirikhan in the south of the country. Salin has done considerable research into this event, and on one of my visits there we travelled to the observing site.

On learning of the construction of Vietnam’s first planetarium, at Vinh City in the country’s north, I was keen to visit, and so was Salin. We travelled from Bangkok to Ho Chi Minh City and went by train to Vinh. There, we met up with the enthusiastic and friendly staff of the planetarium and spent several hours with them discussing planetarium-related issues.

In October 2005, Salin was appointed to the position of director of the Science Centre for Education. Her duties naturally increased, but, of course, she continued to take a great interest in the planetarium and its activities.

Indeed, over her career, Salin has been closely involved in a number of important projects, many of which have taken years of hard work. These have included the establishment of the Memorial Science Park of King Rama IV near Wah Kor, the site of the 1868 eclipse observations.

She has also been involved in the establishment of the Rangsit Science Centre and Planetarium north of Bangkok, and more recently, the Planetarium and Science Centre at Rot Et, in Thailand’s north east.

Amongst her last official duties was her presence at the IAU Asia-Pacific regional Meeting in Chiang Mai, Thailand, in July 2011.

Today, Salin no longer has the daily trip to the office. But her expertise, I’m sure, will still be needed from time to time, and I shan’t be surprised hear that she has been called upon for involvement in, and advice about, various existing and new projects. Above all, I know that she still loves the IPS and its activities and will remain a close friend of our organisation.

Well done, Salin!
Fulldome Filming for Portable Planetariums

It is interesting to read recent discussions and questions about production of fulldome video specifically aimed at portable and small stationary domes. Mobile and small dome planetarians should recognize that their environments require a unique approach and producers of fulldome content might want to optimize sales to these venues by making films that address their specific needs or desires.

Early on in the production of fulldome films, I once asked a planetarian who used them in a portable dome if students experienced any problems during these shows. He said, “I had only one throw up and one wet his pants.” And this was from a teacher who stopped the show several times so that students could have discussions about what they were seeing! Imagine if the films ran straight through with no “interruptions.”

So, one problem is that in these small domes the action scenes are magnified and more intensely affect the viewers. This can, at the very least, distract from the story line and can even make the audience sick. In my book, even one child getting sick is too many.

Even if the producer judiciously limits the number of times the audience zooms through a scene, those few times can be nauseating. So, obviously, the speed of these dramatic parts of the film need to be carefully adjusted for the portable and small dome.

A second problem is that many times the images are so large that they appear extremely distorted on very small domes.

Thirdly, traditional portable domes are truly immersive and every part of the dome is important because students sit in a circle and view the dome from all directions. Most commercial fulldome video currently being produced direct the audience to focus primarily on one section of the dome for full effect, so the audience must be positioned as if they are in a movie theater. It would be a shame if all digital portable domes adopted the movie theater seating arrangement and lost the ability to capitalize on their truly immersive advantage.

And finally, commercial fulldome video, whether it addresses the special needs of small and portable domes or not, is really expensive. Even if these domes are given a discount because of their smaller audiences, their budgets typically still do not allow for purchasing the content they need.

I applaud the small dome folks who are now producing in-house materials to satisfy their special needs. Some of these people are reaching out to others so they can work together and share the expense and the fruits of their labors.

Bryan Hatton, from Techniquest in Cardiff, England, recently began a discussion about this on fulldome@yahooGROUPs.com. His email is bryan_hatton@hotmail.com.

Vincent Jean Victor, Planétarium de Nantes (vincent.jean-victor@mairie-nantes.fr) and Charles Treleaven, Cosmodome Australasia Pty. Ltd. (cosmodome@cosmodome.net) have both shown interest in exploring the idea of collaborating on fulldome content for portable domes.

I do see a trend that planetariums of all sizes are beginning to collaborate in production of fulldome shows and clips. That is a good sign and will save everyone time and money.

Dinosaur Science Dome

Portable dome movies now address a wide variety of science topics. The Science Discovery Dome in the United Kingdom uses a variety of movies that include topics such as natural history, geology, geography and dinosaurs that are shown in a dome that can be positioned indoors as well as outdoors.

Recently they advertised, “With the help of a local expert we are now offering 3D pictures in most of our shows. See the power of 3D images to illustrate science and to stimulate young minds. See scary dinosaurs in 3D using 3D glasses (provided).”

This is the first use of 3D that I am aware if for a mobile dome.

They report that all their films are about 24 minutes long and they normally combine a film and a planetarium star projector presentation, in shows of 50 minutes to an hour in length.

It will be interesting to follow their activities and gauge their success in using movies and especially 3D images in portable domes. I hope they will bring a demonstration to the IPS 2012 Conference in Baton Rouge, and then we can judge if they have solved some of the above-mentioned problems.

Contact Information: www.sciencediscoverydome.co.uk; sciencedome@ntlworld.com

Astronomy Apps

There is a plethora of astronomy apps that you can use with mobile devices. It is difficult to sort them all out and time consuming to try each for yourself. Andrew Fraknoi, for the Astronomical Society of the Pacific, recently compiled a catalog of those apps that he feels are most interesting for educators.

This is a first attempt and Andrew would appreciate hearing suggestions and recommendations for additions to the catalog. To find “Astronomy Apps for Mobile Devices, A First Catalog,” go to the Astronomy Education Review website at aer.aas.org and search for “apps.”

Back to Basics, Part II

I discussed some basic presentation techniques in my last column. Developing strategies for effective presentations is important, as is becoming well versed in the developmental characteristics of the various age groups that you may be working with.

It is always crucial to remember these characteristics as you are writing lesson plans/programs. Even if you are not primarily an educational institution, knowing these characteristics and addressing them can make your programs more entertaining for your audiences.

After exploring some relevant websites, I was impressed by the amount of information available on this topic. Since I am a fan of experiential learning when used appropriately, the first website I gravitated to was a site produced by the University of California Science, Technology and Environmental Literacy (STEL) Workgroup’s Experiential Learning Project Group (ELPG), which can be found at www.experientiallearning.ucdavis.edu/default.shtml. There is a plethora of astronomy apps that you can use with mobile devices. It is difficult to sort them all out and time consuming to try each for yourself. Andrew Fraknoi, for the Astronomical Society of the Pacific, recently compiled a catalog of those apps that he feels are most interesting for educators.

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Involve me, and I will understand.  
—Confucius, around 450 BC

The website also clearly discusses what experiential education is and presents the pedagogy, theory and research-based literature behind it. Listed in the site’s “Experiential Learning Toolbox” is link to a document called “Developmental Characteristics of Youth: Implications for Experiential Learning.”

In that document there are also links to helpful tables that outline developmental characteristics of four groups: 5-8, 9-11, 12-14, and 15-19 and tips for using the experiential learning process with each group. The document states that each table can be used as a “tip sheet for effective teaching and learning strategies when designing rewarding and fun educational experiences.”

And finally, there is a page on this site where three experiential learning training modules are provided. Each module is designed as a 2- to 3-hour staff professional development workshop. The modules are titled:

I found this website to be easily navigated and I feel it could be extremely useful in refreshing our memories and refining what we know about the learning process. The three modules and the developmental characteristics tables could provide an excellent way to inform project developers and volunteers who may not be as versed in model experiential education practices and/or the developmental characteristics of their audience.

One other website that should be on your list for exploration is one that provides Annenberg Learner materials: www.learner.org. Especially of interest on this site is the “Private Universe Project in Science” www.learner.org/workshops/privuniv/intro.html.

Under the section called “History of A Private Universe,” the website reminds us that, “In 1985, Matthew H. Schneps and Philip M. Sadler of the Science Education Department at the Harvard-Smithsonian Center for Astrophysics created A Private Universe, a video program for science teachers. The program opens with a segment in which newly-minted Harvard graduates, dressed in caps and gowns, discuss their theories for the causes of the seasons. The Harvard grads, intelligent and articulate, speak eloquently about their ideas, which are, for the most part, erroneous. Through interviews with high school students and teachers, and scenes of classroom activities, A Private Universe demonstrates how a student’s preconceived ideas and beliefs can pose critical barriers to learning science, whether the learning environment is a public school or a prestigious private college.”

The study has been carried to a higher level as explained by these comments on the website, “Encouraged by the success of the original video, the Harvard-Smithsonian Center for Astrophysics continued the work of A Private Universe by creating the Private Universe Project. Funded by the National Science Foundation, the Annenberg Media Math and Science Project, and the Smithsonian Institution, the Private Universe Project has produced a series of interactive teleconferences for teachers, an instructional television series, and a public broadcast series, all of which examine current research on how children learn science and the implications of that research for the classroom.”

Videos of the teacher workshops can be viewed through links on this page and they will give you a deeper understanding of when and how providing students with opportunities for experiential learning is valuable for challenging their private theories.

It is important for planetarians to understand what kinds of conceptions are learned from different kinds of experiences. What concepts and understandings are created by your powerful planetarium programs and the models used in these programs? These videos may give you some deeper insights about designing appropriate presentations.

Signing Off

Please keep me informed of your thoughts and further ideas about the topics addressed here and about other concerns that you might like discussed.

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**Installing audio/visual components**

(How we do it, continued from Page 38)

Connecting HDMI to VGA with just cables would not work, and now you know, too.

I am currently using the RCA plug for video. Unfortunately, it introduces scan lines for an interlaced image and reduces the resolution by half; it’s not good for fine lines and small details in a projected image.

Blu-ray players will usually have an audio optical out as well. This is the best way to connect to a surround-sound system if it will accept a fiber-optic cable. Fiber-optic cables have no loss for essentially unlimited bandwidth at any length; that’s why phone systems use it over miles and can handle tons of phone calls.

Surround-sound systems run the price gamut from $100 and up. Just by looking you can tell if a system will work for you. If the room is small, a modest system will be fine. The more power the amplifier has, the cleaner and more thunderous the sound will be. If you’re dealing with a large room, you may need separate components with larger speakers and more powerful amplifiers. I admit to not knowing the details in this area. As with all these parts to a project, research is the key to understanding and being able to make a sound (pun intended) decision.

The screen is another major item for the project. The size not only needs to match what is projected, but also what can be comfortably seen by the viewers. As stated earlier, the size ratio we purchased was 16x9, the dimension for most modern movies. It is also the HD standard. As far as its size, it is recommended for an image in a movie theater to have a 30° field of view (FOV) for the back row. This FOV is measured from the viewer to the far left and right edges of the screen. Less than 30° will possibly add eye strain due to a smaller image. Anything wider than 70° will be beyond your peripheral vision. It may also make the apparent pixel size large enough to be seen and be distracting. For HD, the pixel size really isn’t a problem. For 800x600, it can be so. With the 30-70° FOV limit, your distance from the screen is an important factor.

For home theater, about 30° is the recommended size. Our couch is about 11 feet away from the screen, but the projector is mounted above, and a little behind, the center of the couch. So, the projector is 11 feet, 7 inches from the screen.

Another factor to consider is how large can the image be using the zoom feature of the

(Continues on Page 63)
**Turn Left at Orion, 4th Edition**


Reviewed by April Whitt, Fernbank Science Center, Atlanta, Georgia, USA.

How many of us have heard, “I’d like to buy a telescope. What should I get?” Or how about, “I got this telescope for my birthday, but it doesn’t work.”

The general public is looking for guidance in purchasing and using telescopes, and we have the opportunity to share our love of the night sky, and aid some budding astronomers out there. Here’s a great resource for the new observer.

And for those of us with amateur astronomy clubs already in our areas, or maybe even in our facilities, this book is perfect. The tattered remains of the third edition can be laid to rest. The fourth edition is larger in size (“Now your grass stains can extend across the entire page!”) with a spiral binding to allow the book to stay open during observing sessions.

The book’s premise is “stepping” from one object to the next. Directions for centering an object in the finder scope, then moving to the next. Directions for centering an object, then moving to the next. It’s an easy-to-use reference.

And throughout the book, the authors’ sheer joy and enthusiasm for observing the sky with small telescopes shines through, in sidebars and comments. Get this one for your book store, for your favorite amateur astronomer, or for a local astronomy club.

**Kraft Ehrcke’s Extraterrestrial Imperative**


Reviewed by Francine Jackson, University of Rhode Island Planetarium, Providence, Rhode Island, USA.

Sir Isaac Newton is said to have stated that he was able to be the scientist he was because he “stood on the shoulders of giants.” Now, thanks to Marsha Freeman, all of us who are into the space sciences have another giant objects from 2012 to 2024.

Star charts are divided into groups of months (i.e. “seasonal skies: January - March”) rather than seasonal skies: winter, as in the third edition. Groups of objects follow each chart, focusing on the clusters, galaxies and nebulae best viewed during different months. Sections at the end list the best objects to view in the northern and southern hemispheres.

Tables list each object’s name, constellation, and RA & Dec, along with page number and chapter. It’s an easy-to-use reference.

Ehrcke’s biggest disappointments was the end of the Apollo program. His comments concerning the “wasted” expenditure of the space program: “Eliminating...the entire NASA budget and allocating this money elsewhere would be as effective in combating this nation’s high priority problems as cancellation of the morning paper by a person with $700.00 net income would be in paying off the mortgage on the house...” Remember, this was in the 70s.

His vision in designing and pushing for us earthlings to leave the safety of land and venture upward was incredible. He referred to the moon as the “seventh continent,” a dead body that needs to be mined for the betterment of the entire world, with runways slowing landers by friction of the lunar soil.

His goal was to work toward our being a 3-dimensional civilization. Ehrcke had hotels in low-Earth orbit and also created solar-powered generators, singing electromagnetic radiation as a means of opening up third-world countries and bringing them into the realm of technology. His entire life was dedicated to increasing the space program as a means of increasing the lifestyles of humans. He firmly believed that expanding the ability to leave the security blanket of Earth would relieve much of the social problems we have today.

Ehrcke would have been totally disappointed had he seen the end of the manned space program, with no continuation in the near future. His voice never stopped pushing for what he believed was the only way for humanity to continue. Even up to just six weeks before his death by leukemia, Ehrcke was still enthralling audiences with his vision of what the world should be doing, how it should be
The 11 activities include Measuring the Moon Indirectly, Speed of Light, Light Year as Distance, Formation of the Solar System, The Reason for Seasons and Moon Phases. There are readings to accompany and expand the activities, including several on the Earth system, global warming, and angular diameters.

The teacher guides provide a quick overview of what’s happening in the activity and how we know what we know about it, pre-conception questions, a list of student understandings, notes on time management, preparation and procedure. Extended learning tips and web sites are included.

You can learn more at www.nsta.org and search for the title.

I’d recommend this resource for any (or every) science teacher out there. It’s accurate, clear, concise, and easy to use.

☆

Installing audio/visual components

(How we do it, continued from Page 61)

optical lens. Our 800x600 image is just right to fill the screen from top to bottom, but we have unused space on the left and right. The future projector, though, will have the additional width to fill the screen.

A good place to go to online is www.projectorcentral.com. They have calculators for all these factors. You can choose any projector and it will use its specs to work out the numbers.

Screens (and domes, by the way) also have many features. What type of material is it? What is its reflectivity? The general home theater screen type is a vinyl material with a matte-white painted surface. It has a reflectivity gain of 1.1. This works well with our system.

You can pay more and get a higher reflectivity in the range of 1.8 to 2.2, important if you have a very long throw and thus a dim, projected image, or a room with lots of ambient light. These screens look silvery and shiny.

All of these modern screens have black borders. It is recommended to have the projected image just slightly larger (just a few pixels worth) than the white area to create a sharp boundary.

Other features available are screens that have built-in tensioners to keep the screen flat and, if motorized, whether the remote is RF or IR. You can also opt for extra black on top of the screen to allow it to drop lower than the screen case, called «drop.»

An important feature for motorized screens is where the screen sits when it is coiled up and where it stops when it comes down. If you mount the screen above ceiling tiles, you would want the start point with the screen sticking out a bit, but still above the tiles so it’s not visible.

Yet another feature and one I would like to do is to exchange the remote operation of the screen to one that gets its signal from the projector. When the projector is on, it sends a signal, via small wires directly connected to the screen, to open. When the projector is off, it will stop the signal and the screen will retract automatically. Pretty cool!

What we installed is a screen with an 110-inch diagonal, 96x54 inches dimension, 1.1 gain, with a 24-inch drop. This provided us a very large image and is low enough so that we are looking almost straight ahead. Note that this is not good if you have rows of people. The view will be blocked for those behind the front row.

Establish your budget

What can I say about this part of the project? Although all the components are necessary and important, we did not go hog-wild about spending money. We saved a lot by doing the woodworking ourselves, purchasing the products online to find the best price and using equipment we already owned and then slowly replaced along the way.

The Blu-ray player was $20 more than low-end models available locally, a mid-range product that was definitely most worthwhile. The next model up was $50 more and the only difference was that it had wireless Ethernet connectivity instead of wired. This may be very important to you, but it wasn’t worth the cost for us.

The screen is another case where you can save. There are a few companies out there that make screens, and a relatively new company, Elite Screens (www.elitescreens.com), has a full line that includes more standard features at about half the cost of its competitors. We paid a bit extra to get the 24-inch drop on our screen, but that feature was worth it for us.

Proceed with the project

Now that you know what you need and have worked out your budget, you get to install it! As mentioned earlier, you need to make sure you can install all your optical components so they line up. If they deviate greatly, you can digitally compensate with the projector, but this uses up valuable pixels and can in...
More dark skies in Texas, Illinois

The International Dark-Sky Association has named its tenth dark sky park and its fourth dark sky community.

The park is the Big Bend National Park, located in southwest Texas near the Mexican border. The area is within 150 miles of the McDonald Observatory. It is the largest International Dark Sky Park to date. It also was named a “Gold Tier” level site, meaning the skies above the park are free from all but the most minor impacts of light pollution.

Homer Glen, Illinois was named as the fourth International Dark Sky Community. The village, located just 30 miles southwest of Chicago, passed the state’s first stand-alone lighting ordinance in 2007, and a group of Homer Glen citizens started the Illinois Coalition for Responsible Outdoor Lighting, an advocacy group striving for outdoor lighting changes throughout Illinois.

Other International Dark Sky Communities are Flagstaff, Arizona; Borrego Springs, California; and Isle of Sark, Channel Islands (also the world’s first “Dark Sky Island”).

The other Dark Sky Parks are Natural Bridges National Monument, Utah; Galloway Forest Park, Scotland; Zselic National Landscape Protection Area, Hungary; Cherry Springs State Park, Pennsylvania; Clayton Lake State Park, New Mexico; Goldendale Observatory Park, Washington; Hortobagy National Park, Hunbury; The Headlands, Emmet County, Michigan; and Observatory Park, Geauga County, Ohio.

There are also two Certified International Dark Sky Reserves: Exmoor National Park in Devon and Somerset counties, England, and The Reserve at Mont-Megantic, Quebec, Canada.

New book about Carnegie’s legacy

Glenn A. Walsh, the “keeper of the history” for the original Buhl Planetarium in Pittsburgh, shares that a history of Pittsburgh’s original Buhl Planetarium and Institute of Popular Science are included in a new book published by the University of Pittsburgh Press. The book, Palace of Culture: Andrew Carnegie’s Museums and Library in Pittsburgh, was written by Robert J. Gangewere, former adjunct professor of English at Carnegie Mellon University and former editor of Carnegie Magazine for three decades.

The Buhl Planetarium and Institute of Popular Science merged with Carnegie Institute in 1987, thus the reason Buhl’s history is included in this book. The author interviewed Walsh regarding Buhl’s history for the book.

Andrew Carnegie is remembered as one of the world’s greatest philanthropists and the founder of the Carnegie public library. The first opened in his home town of Dunfermline, Scotland, in 1883; the first in the United States was built in 1889 in Braddock, Pennsylvania, the home of one of the Carnegie Steel Company’s mills. More than 2,500 Carnegie libraries were built with money donated by Carnegie in the United States, Britain, Ireland, Canada, Australia, New Zealand, Serbia, the Caribbean, and Fiji.

Googling the news

From the Times of India, Kanpur: The Students of Indian Institute of Technology, Kanpur, are developing a planetarium in the school’s new student activity center. More than 20 students have been working on construction for the past six months. Seating capacity will be 50 for this first-of-its-kind facility.

From the Associated Press: Plans are in the works to build a hotel and planetarium at Arecibo Observatory in Puerto Rico. The $50 million project calls for the planetarium to be constructed within two years and the hotel within five.

Puerto Rico’s Metropolitan University helps to run the 305-meter telescope with California-based SRI International, a nonprofit research group, and the Universities Space Research Association, a Maryland-based nonprofit founded under the National Academy of Sciences.

The project is expected to help promote the observatory as an educational tourism niche in the Caribbean. Among its other objectives is to create a doctoral program in astronomy and space science.

From Forbes: A group of independent game developers called Babycastles and a software developer have been using the dome of the Hayden Planetarium at the Rose Center for Earth and Space, New York City, for 200-person cooperative space game that transforms the theater into “a living, breathing space ship where participants navigate through a fictitious universe.”

RASC names Andy Fraknoi an honorary member

Foothill College Astronomy Instructor Andy Fraknoi has been elected an honorary member of the Royal Astronomical Society of Canada (RASC). The prestigious honor is bestowed on only 15 living people at a time. The chairman of the astronomy department at Foothill College in Los Altos Hills, California, Fraknoi appears to be the first community college educator selected for this honor in the 143-year history of the RASC. Founded in 1868, RASC is Canada’s leading as-
tronomy organization. Other current honorary members of the Society include British astrophysicist Prof. Stephen Hawking; Sir Patrick Moore, the prominent explainer of astronomy in England; Prof. P. J. E. Peebles, the award-winning cosmologist at Princeton University; Prof. Owen Gingerich, the noted historian of astronomy at Harvard University; and Julieta Fierro, one of Mexico's most distinguished astronomy popularizers.

Fraknoi teaches astronomy and “physics for poets” to more than 900 students each year at Foothill College. Named the California Professor of the Year in 2007 by the Carnegie Endowment for Higher Education, he has also received the Gemant Prize of the American Institute of Physics for a lifetime of contributions to physics popularization and connecting physics to the humanities.

Before coming to Foothill, he served as the executive director of the Astronomical Society of the Pacific (which is, in many ways, the counterpart of the RASC in the United States). The International Astronomical Union has named Asteroid 4859 Asteroid Fraknoi to honor his contributions to the public understanding of astronomy.

Even more from Bays Mountain

In addition to When Venus Transits the Sun, Bays Mountain Planetarium also is releasing a fulldome version of one of my favorite programs, The Case of the Disappearing Planet.

In its promotional material, Disappearing Planet is described as “a fun show that looks into the changing status of objects we call planets. It not only covers Pluto, but the temporary planetary status of asteroids as well.”

It is, indeed, a fun show, and teachers in my area of Ohio like it for grades 3-5. The narrator, the gumshoe Skye Watcher, has an outrageously funny Brooklyn (New York) accent (thanks to Robin Byrne, associate professor of Astronomy and Physics at Northeast State Community College, Blountville, Tennessee). I've been running the original slide-based program, which I've updated for playback on our SciDome system here at Youngstown State University, for several years, and I stress critical thinking skills from the very beginning. I found a classic detective's fedora at a thrift shop and wear it while I make the students into "detectives." What do detectives do? What tools do they use? What are their most important tools?

I then tell them that they’re all also scientists because they do the same job (look for clues) and use the same tools (observing, thinking).

The fulldome version should be ready by the time you receive this issue; see Bays Mountain's contact information in the box to the left.

A toy for Star Wars fans

Uncle Milton, the toy company that brought us the Ant Farm™ in the 1950s, is still in operation and has kept up with the times. Its primary brands are focused on the science and nature categories, and major toy series include “In My Room,” which offers Moon in My Room and Solar System in My Room.

The company’s “Explore It” series include three “star theaters” (bedroom star projectors) that increase in ability (and in price, I'm sure) and a “3-D Adventure Projector.”

And, in the “gotta have” category for planetarians who are also Star Wars fanatics, you can get the Death Star Planetarium. It's Darth Vader's Death Star that “transform a darkened room into a planetarium,” according to the company. “Compare the Star Wars galaxy and Earth's night sky, you will,” is the plug from Yoda on the web site (www.unclemilton.com).

Product reviews on Amazon complain about battery and bulb life, but you have to remember that these are toys. They range in price from about US $20 to approximately $100 for the Star Theater Pro projector.

The Death Star is part of the company’s “STAR WARS™” science brand “that combines the unique appeal of the STAR WARS universe with developments in earth-based technology.”
Joseph M. Chamberlain
Adler Planetarium president emeritus

Joseph M. Chamberlain, Ed.D., Adler Planetarium president emeritus and life trustee, died all wires hidden and all components either hidden or mostly so. A special note: Be aware that all projectors have a height deviation in the projected image. This allows you to set a projector on a table and the screen can be much higher for all to see. When you install a projector on the ceiling, however, it is upside down, so the image is lower than the projector.

Start with the desired FOV. From there, it becomes a daisy-chain of measurements that will tell you where to install your equipment. Note, your desired FOV will need to work with the optical zoom range of the projector. Here’s the progression:

- Desired FOV along with throw distance
- Projected image dimensions and diagonal (based on image ratio)
- Screen and projector separation
- Choose screen height along with projector height deviation
- Projector drop

Our home project was such that we wanted all wires hidden and all components either hidden or mostly so. A special note: Because we have a log home, we had to install a piece of wood at the ceiling and have it run between two wooden beams in order to install the projector mount.

Mounting the screen to the beam was somewhat easy. Two basic, 4-inch metal corner brackets attached to the screen case mounting plate. We did have to drill an additional hole in the bracket to let the two bolts align with the case’s mounting plate.

Since the screen was motorized and mounted just below the second floor, we were concerned about vibrations over time. We used 2.5-inch bolts with a regular nut and a locking nut. The long length of the bolt allowed for a long travel before the screen could ever fall off. The locking nut has a nylon insert that grips the bolt to keep it from moving on its own. Having two nuts tightened together acts as a jam nut. This also acts as a lock. I don’t think the screen is going to move.

We wanted the screen case hidden, which meant a type of enclosure needed to be installed around it, and we also needed a light trough for cove lighting. This lighting will provide some very low ambient light, but doesn’t let us see the light source (similar to the low-level lights high up in the ceiling at movie houses). It is not the best to watch a movie in pure darkness.

The last-installed component was a small built-in cabinet to house the audio/visual equipment.

Our home’s log construction made my installation techniques and needs unique. Your physical space also will dictate your installation methods.

I hope this article will help you understand some basic ideas behind this type of project and how to install it. Even if others are installing these components for you, you will now be prepared to work with them in designing it properly. Planetarians have always been a “jack-of-all-trades” kind of folk, and now you can tackle that installation project with confidence.

If you have any questions, please don’t hesitate to contact me at thanz@kingsporttn.gov.

Share and enjoy!

Mark Web

Installing audio/visual components

(How we do it, continued from Page 63)
2012
31 March. Deadline for application for scholarship funds (IPS support Baton Rouge Conference attendance by individuals). www.ips-planetarium.org

14-15 April. Brembate di Sopra, Bergamo, Italy. Italian Association of Planetaria (PLANIT), XXVII National Conference, Italy, and 2nd Full-Dome Italian Festival. During the conference Skype session for planetarians from other countries. www.planetaritaliani.it; contact: osservatorio@serafina.it
18-20 April, “Quality, Honesty and Beauty in science and technology communication,” PCST-International Public Communication of Science and Technology Conference XII, Palazzo dei Congressi, Florence, Italy
5-7 May. ADP 2012, Annual meeting of German speaking planetarians. Beginner, intermediate and advanced sessions. www.adp-planetarium.de
8-12 May: 6th FullDome Festival in the Jena Zeiss-Planetarium. Jena, Germany. The 6th FullDome Festival again will show full-length feature shows, lots of student works and clips of independent and professional producers. The main topic of the Festival will be “Dissolving Space” - How to use fulldome content to make the dome invisible. An international jury will present FullDome Awards for the best entries. Contact: Schorcht Volkmar, schorcht@zeiss.de
31 May – June. ECSI TE Annual Conference (European Network of Science Centres and Museums), Cité de l’Espace, Toulouse, France www.ecsite.net
22-26 July. 21st International Planetarium Society Conference, Irene W. Pennington Planetarium, Louisiana Art & Science Museum, Baton Rouge, Louisiana, USA, jelver@lasm.org, www.ips2012.com. IPS conference will Ustream the opening ceremony, keynote speaker, business meeting, and paper sessions each day. www.ips-planetarium.org, link on IPS 2012, Baton Rouge
7-8 September. British Association of Planetaria (BAP), annual meeting, National Space Centre, Leicester, United Kingdom. Contact: Dr Jenny Shipway, president@planetaria.org.uk
3-16 October. Association of Science-Technology Centers (ASTC) Annual Conference, COSI (Center of Science and Industry), Columbus, Ohio. www.astc.org

2013
16-19 October. Great Lakes Planetarium Association (GLPA), Annual conference, Peoria Riverfront Museum, Peoria, Illinois, USA. Contact: sshafer@lakeview-museum.org www.glpaweb.org

2014
16-20 March. Science Center World Summit, Technopolis, Mechelen and Brussels, Belgium. Partners: Technopolis, Flemish science center, Mechelen, Royal Belgian Institute of Natural Sciences, Brussels. www.technopolis.be
31 March. Deadline for application for scholarship funds (IPS support, Beijing Conference attendance by individuals). www.ips-planetarium.org
June. International Planetarium Society Council Meeting, Beijing, China.
23-27 June. 22nd International Planetarium Society Conference, Beijing Planetarium, China. www.ips2014.org, contact Dr. Zhu Jin, jinzhu@bjp.org.cn

Yearly Deadlines for “A Week in Italy”
31 August. Deadline for the applicants of “An experience in Italy for a French Speaking Planetarium Operator,” in collaboration with APLF.
30 September. Deadline for the applicants of “An experience in Italy for a British Planetarium Operator,” in collaboration with BAP.
For more information on the “Week in Italy,” go to: www.astrofilibresciani.it/Planetari/Week_in_Italy/Week_Italy.htm
For corrections and new information for the Calendar of Events, please send a message to Loris Ramponi at osservatorio@serafinozani.it.

More details about several of these upcoming events are included in the International News column and elsewhere in the Planetarian.

The most up-to-date information also is available online at the International Planetarian’s Calendar of Events at www.ips-planetarium.org/events/conferences.html
Some clever people post jokes on Dome-L. Dave Grebner posted:
Q. How many neutrinos does it take to change a light bulb?
A. None. If the neutrinos go really, really fast, the bulb is no longer burned out.
Alexandre Cherman added:
The bartender says: “We don’t serve faster-than-light particles in here.”
A neutrino enters a bar.
Owen Phairis contributed:
A neutrino get pulled over for exceeding the speed of light by a relativity cop who says:
“We don’t allow spooky action at a distance.”
Dr. Ron Kaitchuk offered one more:
Neutrinos.
Knock, knock.
Paolo Amoroso noted:
Concerning the OPERA neutrino experiment, Italian minister of education and research Mariastella Gelmini boasted about the 45 million EUR Italian public-funded cost for building the neutrino tunnel connecting CERN to the Gran Sasso laboratory. “And this is no joke; she issued an official press release.”
And what about those answers to exam questions? Some high school freshmen have an interesting view of the four states of matter:
The question: List the four states of matter.
The answers:
A. Gas, water, air, plasma
A. Plasma, fire, water, earth
A. Hydrogen, helium, oxygen, carbon
A. Solid, liquid, gas, plasma, Einstein’s condensate

Horseshoe crab nebula?
Pat McQuillan offers a reminiscence: We make many mistakes in the dark tunnel over the years, but one stands out in memory as so good you couldn’t plan it.
When running Star of Wonder in my early days at the Virginia Living Museum, we also ran another program called Lifetide (written by Jon Bell). Lifetide talked about Earth and how great it was with all the life and how there isn’t anywhere else in the solar system that would support life, etc. etc.
Well, one part of the program explained how horseshoe crabs would mate during the full moon. We had a horseshoe crab image in the middle zoom projector.
In Star of Wonder it talks about all the things that were most likely not the star of the Bible. Like a supernova. It mentioned the Crab Nebula as an example. One part of the script went (yes it is still stuck in my brain after viewing it over 1,000 times): “Stellar novae were not new stars, but stars near the end of their life. Up close we would see a dying star, its outer layers flung into space in the...etc.” Well, somehow the zoom projector did not get reset.
So up zooms, not the expanding gas cloud image, but (you guessed it) the horseshoe crab image. I heard several older ladies chatting as they left the program about how they enjoyed the show. One lady said, “And that Crab Nebula really does look like a crab. Isn’t the universe amazing?” As far as I could tell she was being serious.

Dr. Kaler’s bits of wisdom
The Great Lakes Planetarium Association met in Champaign, Illinois last fall. Dr. Jim Kaler offered a list of Cosmic Mysteries. From his seat behind the star projector, he noted that, “I used to run the Zeiss, so I’m comfortable here. This is a quick route to the bathroom. And an escape route.”
Well known for his carousel trays of slides, Dr. Kaler mentioned that “he’d dropped the thumb drive on the floor, and all the slides fell out. I had to re-stick them in,” and “The beauty of powerpoint is you’re not limited to 80 images.”
Some more of his wisdom:
“If you can imagine taking photographic plates without computers and resolving stars, you’re a better person than I am.”
“I seem to have lost the pointer. Oh, there are two buttons. One must be the button of death. It shoots out gamma rays.”

After the conference, Zeiss sponsored a trip to Peoria, to see Sheldon Schaefers brand new ZKP4 projector.
Sheldon told us that the ZKP4’s name was “Luke” since it was a Skywalker. Their previous instrument, a Spitz, was named “Mark.” (The new computer in back has been dubbed “Seven of Nine.”)
Sheldon is delighted with the accuracy of the new projector (Daniel Arnberg mentioned that he believed it “would guide him home”) and wanted to demonstrate it.
Several people asked for dates of particular events: an upcoming solar eclipse and the transit of Venus. Alan Pareis requested 17 June 3 BCE.
A voice from the audience inquired, “birthday?”
While Sheldon struggled briefly with the unfamiliar console, looking for a “plus” or “minus” for the year counter he muttered, “There ought to be a sign.”
A voice from behind me observed “I believe there was.”

This artifact was discovered on the white-painted outer wall of the Ralph Buice Memorial observatory here at Fernbank. The lipstick shows that some people really love astronomy, I guess. Photo by Ed Albin.
The revolutionary power of Digistar 4 is now portable.

The new Digistar Outreach uses a single DLP video projector with a fisheye lens, bringing uncompromising big screen planetarium experiences to inflatable domes.

From a simple iPad interface, you can harness the power of Digistar to reach out to your community in ways you never thought possible.
Beyond your dreams...

SkyExplorer V3
Real Time Universe

a RSA Cosmos Software

www.rsacosmos.com