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December 2009 Vol. 38 No. 4

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Book Reviews
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On the Cover: Past IPS President Martin Ratcliffe was among those presenting astronomy education activities at a star party at the White House in October. He took the opportunity to put his projector, Sky-Skan’s definit®, in a good light. Any why not? He now works for Sky-Skan, and it’s good to keep the bosses happy—especially the top boss of the United States. See his story on page 20.

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I enjoyed seeing all those happy faces in Shaaron Leverment’s article about sharing the stars across continents (see page 26). What is it with some kids, no matter where they live, that requires the making of a face when a camera appears? I’ll bet there’s a cave painting somewhere that features a kid with a tongue pointing, and thousands of years from now there will be kids in class pictures on Mars with the same oral muscle poking out. But again, we wouldn’t have our kids any other way, would we.

I will guess that Sasha and Melia, first daughters or not, have even shown that remarkable organ of taste to their dad.

I was pleased to read in Martin Ratcliffe’s story (see page 20) about the White House star party that President Barack Obama spent a hour enjoying the activities with his family. The fact that the busiest and most stressed-out dad in our country made the time to share educational activities says a lot about the man. I have no feelings at all about matters political, but I do appreciate families that make education a priority.

President Obama made the stars and astronomy part of the education for a nation on the night of October 7. Students in Bristol and Cape Town made the stars the connecting thread between their two cultures and learned so much about each other as a result.

In Rome, a transit of an extra-solar planet helped celebrate the life of Giordano Bruno, who died centuries ago for the belief that such far off planets had to exist.

The stars connect us across time and across the world. And the stars connect us, the planetarians of the world. We’re as tied together as the students in Great Britain and South Africa are. We’re committed to education, and we were out there on the lawn at the White House, along with other astronomy educators who don’t have the great fortune to work daily under a dome of stars. What a great job we have.

Take a close look at Joachin Koppen’s story about listing to sounds from space (page 24). Here we have a planetarian from France writing about a project he learned in California, illustrated with a picture of a student from Spain taken by a student from Thailand. Again, we truly have the best jobs in the world.

You’ll see a real mix of articles in this issue of the Planetarian. Many feature projects for the International Year of Astronomy, and if you have an event that you’d like to share, please send it in. I’ll even print pictures of those inevitable tongues.

A bit off the usual track is Steve Tidsey’s book review (page 18). It’s obvious that Steve is passionate about the topic of climate change, and, as an eclectic man about the pages of the Planetarian, I am glad we didn’t have to reject his article for the Book Reviews section because of its length.

Does that mean that I agree with his views, or that they are the views of the International Planetarium Society? Of course not. We each have our own views and respect the rights of others to voice them. Which means if anyone out there would like to refute (or support) anything in Steve’s article, you’re more than welcome to drop me an email—my address is right there at the top of the page—and I’ll put together a Letters page in the March issue.

Our busy vendors

We each do our part for astronomy education—and our vendors are no exception. After all, a planetarium without a star projector is just a room with a hemispherical ceiling, and the vendors ultimately are the ones to credit.

I’m trying very hard to ignore the fact that there’s a global immersion ad on the facing page at this point, because I wanted to point out several of the projects that GI has been involved with over the past year. No, of course they’re not paying me.

Did you know that the planetarium in Dubai has been upgraded to fulldome? (Did you know there was a planetarium in Dubai?) It’s called the Children’s City Science Center, and its 13.4-m (44-ft) dome has 102 seats.

The upgrade is to a Fidelity Bright system, and the first shows presented were DarkStar Adventure and Oasis in Space, both from Spitz Creative Media.

Children’s City is the first educational facility in the UAE devoted to the education of young children (ages 2 to 15).

GI also recently installed a Fidelity Bright digital fulldome system at Destination Cosmos at the Futuroscope theme park in Poitiers, France. Destination Cosmos attracts approximately 800,000 visitors a year, and its recent program has been the French-dubbed version of the American Museum of Natural History’s Search for Life.

Let’s move on to Greece, where GI upgraded the server for the DLP fulldome projection system at the planetarium at the Thessaloniki Science Center of Technology Museum. I’m sure the planetarium appreciated the upgrade when it came time for the educational event later in the year that linked school children with the International Space State (see page 53).

Not bad for a vendor that makes its home in a barn. (GI’s official address is The Barn, Hurstwood Grange, Hurstwood Lane, Haywards Heath, West Sussex, United Kingdom.)
Fidelity GO™ is our new premium solution for smaller dome theaters up to 13 meters in diameter.

We use the latest LED projection technology (with up to 100,000 hours of lamp life we might add!), our own high-spec server, Uniview™, Fidelity™ software suite, wireless theater control and more... and to make it extra special, we gave it a price that starts under $200,000.

Great things really do come in small packages.
Abstract
The display technologies now readily available for digital planetariums mean that a wide variety of content—not all of which need be astronomy related—can be visualized in fulldome theaters. At the Denver Museum of Nature & Science’s Gates Planetarium, we have used SCISS AB’s real-time Uniview software platform for an ongoing series of public lectures on geology, geography, resource use, and global change.
These live presentations allow audiences of over 100 people to experience visually rich depictions of the surface of the Earth—through flights that mimic the low-Earth orbital trajectories of astronauts—and view a variety of geospatial datasets in an exciting and engaging fashion.
Survey results from those who have attended these lectures show that the immersive presentations are effective in heightening visitor interest in the lecture topics. These surveys, along with follow-up oral interviews, confirm that the primary attraction of the fulldome theater is the enormous, immersive display, followed by the real-time interaction (including the ability to fly anywhere, and to show detail at multiple scales). Based on these findings and previous research that may be applicable, digital planetarium tools have a powerful potential for geoscience education.
Earth visualizations at the Gates Planetarium

Astronomy simulation software is now available from multiple vendors to the nearly 600 fulldome theaters in operation [12]. These visualization programs can show digital versions of not just a traditional planetarium’s night sky view, but also the rest of the known universe.

At the Denver Museum of Nature & Science’s Gates Planetarium, we have turned our focus in a new lecture series back onto the Earth instead of the sky. Given the completely immersive and visually rich nature of the data representation inside the dome, audiences can have the experience of viewing the Earth as it is seen by astronauts in orbit. In this paper, we present our attempts to use immersive virtual flights over a digital Earth for informal science education lectures on the geosciences and other topics about the Earth, and to gauge the audience response to the technology used this way.

The Gates Planetarium is a uni-directional fulldome theater, with a dome tilt of 25° and enough seating to accommodate 120 visitors [11]. The first geological visualizations shown in this facility were based on research done through DMNS’ Denver Basin Project [14]. Groundwater resources are scarce in the area south of Denver. Studies of the geology of the region indicate that the best aquifers are found in fans of coarse sedimentary rocks deposited by ancient rivers flowing off the Rocky Mountains from long vanished canyons [13].

In an area where the population is steadily increasing and is more than 90% dependent on groundwater.

In 2005, we converted a three-dimensional model of the Denver Basin into a format that could be loaded into IMAGE_PAN, an in-house real-time visualization package written for the SGI Onyx 3800 that was installed in the Gates Planetarium at that time [11]. The model was shown in virtual tours for a DMNS geology class about the Denver Basin and its water resources, and for a group of oil exploration geologists in preparation for a field trip about the synorogenic strata in the Denver Basin.

The enthusiastic response from the attendees of these events revealed the potential for the fulldome planetarium to present compelling stories about geology in visually striking ways.

We were also inspired by the success of the Gaia Journeys concerts in the Gates dome with musician and filmmaker Kenji Williams [19]. These four sold-out concerts, which took place in February 2007, were accompanied by live choreographed flights over the Earth with SCISS AB’s real-time visualization platform, Uniview.

The dynamic, high resolution views of the globe were meant to give the audience a sense of what astronauts felt as they looked at the Earth from orbit. The positive audience reaction to this event was further evidence that a fulldome theater could be used to present compelling visuals of our home planet.

Geology goes digital

Based on the success of these early experiments, we worked on a follow-up of regular lectures that would make use of the Gates Planetarium’s visualization capability with Uniview. Although its primary function is to simulate a virtual universe, populated with catalogs of objects based on three-dimensional astrophysical databases, Uniview can also generate realistic depictions of the surfaces of the Earth and other planets. Detailed high resolution satellite imagery are drawn from WMS (web mapping service) remote servers and then mapped onto topography of the surface generated from digital elevation maps.

Using physics-based renderings of the atmosphere, including the effects of Rayleigh scattering, Uniview can give a visually rich and realistic depiction of the Earth, ranging from deep space to a distance of hundreds of meters above its surface.

Because loading externally created 3D models was still difficult in Uniview, the new lecture series would not focus on three-dimensional subsurface models, but would concentrate instead on visible surface features that highlight geological principles. External WMS servers, including Near Earth Observatory (NEO) and OnEarth from NASA, were accessed to stream composite imagery from Landsat 7, the General Bathymetric Chart of the Oceans (GEBCO), and data from the MODIS sensors from the Aqua and Terra satellites. Additional geospatial datasets were loaded as local KML files.

Appearing at roughly bi-monthly intervals, six lectures, called Geography Goes Digital, were given in 2008. In 2009, the lecture series was re-titled Digital Earth, and four have appeared so far as of September 2009. The main topics covered in the 60+ minute talks include water resources, rift valleys, fault systems, earthquakes, plate tectonics, volcanoes, the highest and lowest points on each continent, rivers and their deltas, locations of oil and gas resources, and how...
these topics affected people directly and indirectly.

The free-ranging style of the lectures meant that each talk often touched upon secondary topics like regional agriculture, grazing patterns, water use, geography, biodiversity, history, and local cultures. (See the Appendix for instructions to download part of one of these lectures.)

Visitor reactions

Visiting a museum or a science center is a free-choice experience in that the visitor makes a conscious decision to engage in the visit, and is not compelled to attend (as is the case in formal education). The factors that influence this decision vary greatly: the personal context (visitor interest and motivation), the social context (the group that the visitor comes with); the visitor experience will be different whether he is a child on a field trip, versus an adult in a family or an adult in a group with other adults), as well as the physical setting of the museum itself[5].

While the factual information found in the GGD/DE lectures may not differ much (other than the display technology) from what could be presented in a formal classroom, assessing their impact on the visitor is a more difficult task.

Unlike formal schooling, the visitor is not obliged to attend every talk in a series. Instead of the repetition which is necessary for deep understanding, the visitor is likely to be exposed to a topic in only a short, isolated burst, such as within the confines of a single hour-long talk. And not only are examinations and academic rankings not possible for a museum audience, such assessment tools are typically inappropriate to use since they run counter to visitors' expectation of the museum program as a leisure experience.

As a result, assessments for informal education programs are usually qualitative in nature, instead of quantitative tests of hypotheses[9]. Given the great number of factors that shape a visitor's reaction to an informal museum program (e.g., from the lecture itself to the diverse backgrounds of the audience), we have chosen to focus on only a few measurable outcomes[1].

In our study of visitor reactions to the GGD/DE lectures, we are still exploring the types and range of responses to the experiences. To do this, we use questionnaires handed out before the start of each lecture, which the visitors are expected to fill out immediately after the program.

The written evaluations at the first four GGD talks were based on stock forms used by the Adult Programs division at DMNS, which is responsible for running all evening lectures. Although they ask about overall visitor satisfaction, these surveys did not contain queries that could help pinpoint the audience's reaction to the fulldome planetarium as a venue, and the impact of the real-time visualization software.

Subsequent evaluations (28 October 2008 and later) were re-written to include a series of questions targeting the effectiveness of the GGD/DE lectures via self-reporting by visitors to questions using Likert scale rankings from 1-5 (with 1=low and 5=high):

- “How satisfied were you with this program?”
- “How much did you feel you learned?”
- “What was your interest in the topics covered tonight before the lecture?”
- “What was your interest in the topics covered tonight after the lecture?”
- “How much did you enjoy most about tonight’s presentation?”
- “What were the most important things you learned tonight?”
- “How could tonight’s presentation be improved?”

Additional space in the form was given for written answers to “What did you enjoy most about tonight’s presentation?”, “What were the most important things you learned tonight?”, “What did you like best about the presentation being in the planetarium?”, and “How could tonight’s presentation be improved?”

Self-reported summaries of the mean satisfaction, the amount the visitor felt he learned, and interest in the topics (before and after the lecture) are shown in Table 1, along with the standard deviations (S.D.), and the size of each sample (N).

![An elevation view of the Gates Planetarium from stage right, showing the 17.5 meter diameter, 25° tilted dome, with stadium style seating and the locations of the digital projectors. A set of six Projection Design F30 SXGA+ projectors were installed by Global Immersion as part of their Fidelity Bright system during a renovation in 2007. Shown are the locations of four projectors and their throw vectors. Two additional projectors (not shown) cover the Front and Back Left sides of the dome. All images provided by author.](image)

The satisfaction ratings are slightly less than the average M=4.6 for all DMNS visitor programs. Because detailed survey results for Adult Programs have not been traditionally kept, we do not have a standard deviation for visitor satisfaction averaged over all programs with which to make comparisons. Furthermore, questions 2–4 above have no comparable direct analogues to those in previous written evaluations from Adult Programs.

Comparisons of the before and after interest were performed via a one way analysis of variance (T-test). Calculations of the F statistic (the ratio of the variance between samples and variance within a sample) give F=12.242, 13.497, 21.075, 10.656, 5.208, and 12.135 for the October 2008, November 2008, January 2009, March 2009, May 2009, and July 2009 lectures, respectively. Therefore there is a significant difference (null hypothesis that there is no difference in visitor interest is rejected with a probability p < 0.001 for all shows, except for p < 0.025 for May 2009) in the self-reported interest in the topics discussed as a result of the lecture.

In addition to the Likert scale questions, visitors were given space in the survey form to write their comments. Three of the questions (“What did you enjoy most about tonight’s program?”, “What were the most important things you learned tonight?”, and “How could
**FULL DOME SPACE SHOWS**

Passport to the Universe  Sonic Vision  The Search for Life  Cosmic Collisions

**2009/2010 PRICING**

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<thead>
<tr>
<th>Dome Type</th>
<th>The Search for Life OR Passport to the Universe OR Sonic Vision</th>
<th>Cosmic Collisions</th>
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<td>High Resolution 100+ seat domes with high annual attendance (200,000/yr+)</td>
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<td>$40,000</td>
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<td>High Resolution &lt;100 seat domes</td>
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</table>

Above costs are for 1 year license

Licensing information available at amnh.org/traveling
tonight’s presentation be improved?”) were used to gauge the overall effectiveness of the lecture material. A fourth question (“What did you like best about the presentation being in the planetarium?”) was inserted to determine visitor reactions to the fulldome venue and the projection technology.

The written responses tended to be compact—possibly because the visitors wished to make their way home as soon as possible. The answers tended to focus on just a single topic, and few visitors wrote more than a single phrase or a sentence. Because of the succinctness of these answers, the responses can be easily categorized into distinct subgroups.

Out of the 161 total responses received for this question, the largest plurality of 58 (or 36%) answers mentioned the digital fulldome visuals. (All quotes are transcribed with spelling and grammar intact.)

- outstanding visuals
- the incredible view
- spectacular view of the earth
- amazing pictures—you felt like you were flying above the earth and seeing these landmarks
- Visual! Makes geology come to life

The next largest group of comments was from visitors (35 or 22%) impressed by the dome and the size or the scale of the projected visuals.

- It’s like Imax + Google Earth!
- screens are huge...
- Viewing the earth on a large scale was fun
- Seeing the earth on a large scale
- Size of images.
- Large screen graphics
- the full overhead view. Full immersion

Sixteen or 10% of the comments fell into the broad category of real-time motion. Many visitors were simply impressed by the simulation of flight or the ability to travel anywhere around the Earth:

- Moving around the world, zooming in getting a great understanding of details of the areas shown.
- Feeling as if flying
- Being able to feel like I was flying over the earth
- amazing pictures – you felt like you were flying above the earth and seeing these landmarks. Much better than a PowerPoint in a lecture hall.
- Ability to move in space and time

The ability to move in close to as well as fly away from the surface of the Earth appeared in several comments:

- Zooming in from outer space — very nice
- unique views and ability to move views
- comfortable, broad view, zoom in/out.

Such transitions between different size scales allowed visitors to make connections between smaller and larger macroscopic views:

- Ability to show macro & micro geography
- Moving around the world, zooming in getting a great understanding of details of the areas shown

For several respondents, having a virtual representation of the Earth also seemed like a more natural way to study the world:

- seeing geography as it is instead of flat as on maps
- the ability to see the earth as it is instead of on flat maps

**Follow-up telephone interviews**

From the 28 October, 2008 lecture onwards, the evaluation forms requested permission for us to contact the visitor for short oral interviews. To entice the visitors to participate, we handed out one free planetarium ticket to each person who handed back a filled out written evaluation, and two tickets to those who also shared their personal contact information for a future interview.

In order to get a fresh perspectives and impressions of the fulldome theater, interview subjects were selected from those who had stated on their evaluation forms that they had not previously seen a live planetarium lecture using the Uniview software. Out of these, a pre-

### Table 1

<table>
<thead>
<tr>
<th>Date</th>
<th>Overall Satisfaction</th>
<th>Amount Learned</th>
<th>Interest in topics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>M</strong> S.D.</td>
<td><strong>M</strong> S.D.</td>
<td><strong>BEFORE</strong> M S.D.</td>
</tr>
<tr>
<td>28 Oct 2008</td>
<td>4.33 0.61</td>
<td>4.07 0.59</td>
<td>3.60 0.96</td>
</tr>
<tr>
<td></td>
<td>(N = 43)</td>
<td>(N = 43)</td>
<td>(N = 42)</td>
</tr>
<tr>
<td>11 Nov 2008</td>
<td>4.48 0.54</td>
<td>4.20 0.63</td>
<td>3.68 0.98</td>
</tr>
<tr>
<td></td>
<td>(N = 52)</td>
<td>(N = 54)</td>
<td>(N = 53)</td>
</tr>
<tr>
<td>13 Jan 2009</td>
<td>4.43 0.59</td>
<td>4.25 0.49</td>
<td>3.48 0.88</td>
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<tr>
<td></td>
<td>(N = 44)</td>
<td>(N = 44)</td>
<td>(N = 44)</td>
</tr>
<tr>
<td>11 Mar 2009</td>
<td>4.20 0.66</td>
<td>4.14 ± 0.63</td>
<td>3.67 0.89</td>
</tr>
<tr>
<td></td>
<td>(N = 60)</td>
<td>(N = 61)</td>
<td>(N = 62)</td>
</tr>
<tr>
<td>19 May 2009</td>
<td>4.20 0.81</td>
<td>.97 0.76</td>
<td>3.35 0.86</td>
</tr>
<tr>
<td>07 Jul 2009</td>
<td>4.19 0.79</td>
<td>3.96 0.83</td>
<td>3.35 0.90</td>
</tr>
<tr>
<td></td>
<td>(N = 37)</td>
<td>(N = 56)</td>
<td>(N = 57)</td>
</tr>
</tbody>
</table>

Positive effects from museum programs may occur long after the original experience by a visitor [2]. In our attempts to begin to understand whether our live digital planetarium lectures can have such a long-term impact, our telephone interviews were intentionally undertaken many weeks, and sometimes months, after the occurrence of the original lecture.

The primary goal of these interviews would be to assess whether the planetarium presentations were able to increase a visitor’s interest in and motivation to learn more about the topics discussed. Results from the first two questions—“What do you remember learning from the lecture” and “Did you become more interested in any of the topics covered in the lecture as a result of the talk?”—are discussed in [18].

In this paper, we examine the answers to the questions “What do you think about using the planetarium for lectures like these? Is it a good forum for these talks? What are some advantages/disadvantages?” and the follow-up, “Would you have enjoyed it as much if the talk took place in a regular classroom or auditorium?”

These questions were asked of seven visitors who attended the 13 January 2009 presentation (interviewed roughly 20 weeks after the lecture), and another seven from the 10 March 2009 presentation (interviewed 11 weeks later). The interviewees were contacted by phone or email the week before to make sure they still agreed to the interview, and to set up a time and date to be contacted by telephone. Each interview lasted 5-10 minutes. Two interviewers followed a scripted set of questions, and typed each subject’s responses into a word processor file. In the sample were eleven men and three women. The participants ages fell into the brackets: one in 18–25, four in 26–35, three in 46–55, three in 56–65, and three in 66–75.

The responses tended to confirm the results from the written evaluations that the display system of the fulldome planetarium contributed positively to the experience:

- I think it was great. Such a wonderful display, big maps for a visual presentation. It was intimate and the lecturer was right
there [which was good]. In the planetarium the seating is such that it’s easier for everyone to see and you get the feeling you see more because of the way the dome is built. [The IMAX theater] would be the only other place you could have it, but the planetarium is much more intimate than IMAX.

- Very nice. Advantage was the very large picture. I don’t want to say panorama … you were able to… wrap around … showed the large areas and you could see the details. [He and his wife] spent a half hour last night talking about it and trying to remember details from the show.
- I do think the space has a lot to do with the impact. The visual presentation is extraordinary. And if you were in a classroom, you wouldn’t have that.

Both the immersive and real-time aspects of the presentation were highlighted by some of those interviewed:
- I loved it; great venue. The only disadvantage was we were sitting toward the front; I remember thinking if we’d got there earlier, we could have gotten seats higher up. The planetarium allows you to have more interaction. You feel like you’re in the middle of [what’s going on] with the big rounded ceiling, there’s no way you can be passive or impersonal about it when it envelops you. It’s really engaging. I imagine it wouldn’t work for some topics, but this was great. When you’re talking about something that was huge, it helps you feel like you’re there. The lecturer’s ability to drive the map to various parts of the world—it helped them be flexible. Not static, but a very dynamic presentation.
- Advantages are you get to travel vicariously. It’s different than looking at a paper map; to see the Earth without national boundaries, to zoom in and see what a city is like. You can’t get those things from an atlas. The only disadvantage is that you can’t really see the speaker. Bob is really good at keeping your attention on the topic though.
- It’s set up as a presentation hall, not as a discussion hall. I’m not sure you can have both. I don’t think it encourages dialog. If one of the goals is to follow a lecture with a robust discussion, the setting is less than ideal, but I’m not sure that has to be the goal. If what you’ve done is gotten people interested and there are other opportunities for discussion, that could be good.

The follow-up question, “Would you have enjoyed it as much if the talk took place in a regular classroom or auditorium,” was answered by everyone in the negative. The following responses were typical:
- No. I do think the space has a lot to do with the impact … the visual presentation is extraordinary. And if you were in a classroom you wouldn’t have that. A classroom … you would lose a lot of the effect … I think “big” is the answer. It’s easier to see features when it’s bigger; much more difficult to see features when it’s on a small screen.
- I would guess not. The places you typically have lectures—well, there’s not exactly a visibility problem, but the map would be relegated to a screen in the front and you
wouldn’t see as well because the picture would be smaller and would have to fit on the screen. It would be more like lecture than an experience.

• I don’t think that I would because of the graphics that were much more. Just the size of the graphics! In a classroom setting, they wouldn’t be nearly as effective.

• It would depend on the sound system and what you were looking at. A little flat screen in front would not be nearly as good and that’s what I imagine when I think of a classroom.

• Absolutely not. Further, I don’t think I would attend them in a regular classroom.

Discussion

The visitor data from both the written surveys and the telephone interviews show that the fulldome display has a dramatic impact on our typical audience member. In the short written responses, visitors repeatedly cite the visuals as what they liked about the lectures. Comments from the oral interviews give more detailed reasons why this may be the case. Some of the comments (“big maps for a visual presentation,” “it’s easier to see features when it’s bigger”) suggest that the physical size and field-of-view (FOV) of the display made it easier to “see the details.”

Audience members also appear to have been highly immersed in the visual simulation (“it envelops you,” “it helps you feel like you’re there”). The ability to go anywhere in the world, “to travel vicariously” and to “zoom in and see what a city is like” meant that the viewers experienced a “not static, but a very dynamic presentation.”

Currently little research on the effectiveness or the impact of fulldome planetariums exist (although there are several ongoing research programs). However, there exists prior work on video screens with wide FOVs and on physically large displays. In these past studies, viewers reported greater excitement, intensity, and enjoyment when watching content on a large television, compared to those viewing the same programs on smaller screens [8].

Video images on larger screens are more attention-grabbing, and can provoke greater emotional responses (arousal) [15]. Better recall of pictures is linked to both larger screens [4] and to imagery that is emotionally arousing [7]. Physically larger displays (irrespective of the actual perceived FOV) have also been found to be beneficial to spatial knowledge of and navigation through virtual environments [3, 16].

Although these studies examined the effect of flat screen displays on their users, it is intriguing to extrapolate their conclusions to fulldome theaters, which have perhaps the widest FOV and largest display screens that are easily accessible to the public. The excitement and level of engagement that has been professed by our participants in the qualitative interviews are consistent with the results from research on the affective response to large displays. This suggests that there could be other common audience responses between large flat screens and fulldome planetariums.

Both the arousal from video content as well as from the large display itself could be advantageous for recall of content. Since physically large and wide displays have benefits for spatial learning, fulldome planetariums could, in turn, be an ideal environment for understanding spatial layouts, and navigating through simulated virtual environments.

A natural direction for future research is to quantify the effectiveness of fulldome theaters for commanding attention and provoking arousal in participants, while comparing them to their less immersive counterparts. Spatial understanding does come into play in basic astronomy education (e.g., phases of the moon and seasons; [17]), but it is much more important for education in the geosciences [6, 10]. Although coming from an astronomy tradition, fulldome planetariums could therefore play a prominent role in geoscience education.

Finally, when asked to consider the same presentation in a traditional classroom instead of the planetarium, all 14 respondents interviewed were uniformly against the idea. In their minds, there simply was no comparison between the immense and immersive visuals provided by the large fulldome theater and the much smaller, flat visuals that would be available in a classroom or lecture hall.

In a tilted theater with uni-directional seating like the Gates Planetarium, not only are the visuals captivating, but the majority of the seats provide good views of the domed display. Thus it is not surprising that the narrow window of a projection screen in a classroom (or a home computer display running Google Earth) by comparison would be “more like a lecture than an experience.”

Appendix: Digital Earth multimedia

A movie of the 7 October 2008 Geography Goes Digital lecture on the topic of rift valleys has been created using Robert G. Raynolds’ original lecture audio, combined with a frame sequence rendered in Uniview from the flight path flown live that night by the author. The visual sequence shows navigation over the eastern African rift valley using Landsat 7 imagery. Except for the FOV and projection, and the laser pointer being used by the speaker, the content is what the audience in the Gates Planetarium would have seen that evening. The AVI file has a running time of 26:42 (roughly a third of the original lecture’s total length), is 178 megabytes in size, and can be downloaded via the URL: scientists.dmnms.org/kachun/digital_earth/ggd100708.avi

Acknowledgements

We thank David Champlin and Deirdre Goldsworth, who contacted and interviewed all of the visitors; Julia Spaulding and Margaret Hester from DMNS’ Adult Programs division for help with distributing and collating the written evaluations; Greg Mancari for technical assistance with the interviews; and Katherine Honda for library research. We also acknowledge Bob Raynolds, who has been instrumental in helping to develop and continuing to be a key driver of the GGD/DE series; and Marieke Dechesne, who created several of the datasets used in the lectures, and provided additional information on the Denver Basin project.

References/Notes


(Continues on page 64)
5, 4, 3, 2...

With the Spitz SciDome, powered by Starry Night, you don’t have to choose between powerful performance and great teaching capability. SciDome HD delivers 2K resolution, 8000 lumen projection, and the most comprehensive astronomical software available. SciDome is the ultimate educational planetarium, with dozens of lessons created specifically for fulldome teaching - plus Starry Night’s K-12 curriculum for extended space science education in the classroom. SciDome makes it easy to create your own lessons and programs - so let your imagination soar. Contact Spitz to learn about the powerful teaching options of SciDome HD.
Can small planetariums produce their own fulldome digital content?

(Yes, and they do)

Whether you call it tradition or necessity, the fact is that in the planetarium community, especially among the smaller venues, in-house content production is common practice. Upgrading to fulldome digital technology is not going to change the planetarium DIY culture, nor should it.

Even with a skeleton staff and a shoestring budget, a planetarium with a fulldome system has several options for staying in the pilot’s seat when it comes to creating content and customized programming, whether both real-time or pre-rendered, to suit one’s particular audience.

The ever expanding list of options, tools and strategies includes:

- Real-time sky shows using digital databases and navigation software
- Domecasting: remote streaming of live shows
- Digital production tools customized for the dome, proprietary and open-source
- Recruiting affordable animation talent as needed
- Acquiring new skills in production workshops

The Power of Real-Time

“Interactive, real-time 3D digital projection is returning us to a situation very similar to the way planetariums were run in the 1920s, only it happens that now we can simulate flying away from the surface of Earth,” says David McConville, who is director of Noospheric Research at the Elumenati, makers of the portable GeoDome recently seen at President Obama’s stargazing party on the White House lawn in Washington DC.

“We have brought back the storyteller/narrator taking the audience on a trip, thanks to the astronomy and Earth science visualization platforms provided by software such as Uniview, Digital Sky, and Stellarium,” he explains. “We can now simulate flying into the night sky and beyond it, seeing constellations from different perspectives. We can tell not just the story of the night sky, but a much bigger picture cosmic story about Earth’s place in the cosmos.”

Used in an educational context, real-time navigation makes the planetarium into a state-of-the-art digital classroom. In a public setting it creates a dramatic multimedia show. McConville reported that two shows at the Morrison Planetarium at the California Academy of Science in San Francisco were filled to capacity when he presented “Perceiving Home: An Ecological Tool of the Cosmos,” in which his live narration was accompanied by a live viola performance. “Whoever sees this as a dying art hasn’t seen it as an art form,” he observed.

The Elumenati trains users of its GeoDome system on how to use the Uniview data visualization platform, which can be controlled with a game controller or mouse. “It’s not nearly as complicated as Photoshop,” he says. “Some people get it in a couple of hours. The biggest issue is knowing the science, and planetariums already know the science.”

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Because of the topic of this issue’s IMERSA column, the editor decided to give it more prominence. The regular column format will return next issue. -ed.
Created by SCISS AB, Uniview is packaged with NASA’s Digital Universe Atlas, and users can import additional databases via the Internet from the servers of NASA, NOAA and other science organizations.

Domecasting is another area for which the Elumenati provides support. One live story can be broadcast remotely to eight theaters at a time, via an Internet connection using Uniview’s Octopus networking feature. Carter Emmart (AMNH), David Herring (NOAA), Joel Halvorson (Minnesota Planetarium Society) and Matt Linke (University of Michigan) are all prolific domecasters, according to McConville.

Blender man

Ott Planetarium installed its Konica Minolta Medialobe-I fulldome system in late 2004. The 30-foot, 60-seat dome theater has been open since 1969 at Weber State University in Ogden, Utah. “We replaced our old starball and old projectors, and said, ‘let’s make stuff ourselves,’” says Ron Proctor, production coordinator. Using 3D Studio Max, in 2005 Ott produced Great Space Race. In 2006, NASA enlisted Ott to create a curriculum-based fulldome series. To make the most of the available funds, the decision was made to produce with Blender open-source software.

“Since switching, we’ve become a post-er child of open-source software in planetarium production,” notes Proctor. “We like it because it makes things accessible to all the little guys. It took quite a bit of work to transition over, but it’s free and the updates are free. The capabilities are approximately the same as commercial 3D software, and we’ve come up with ways to make it work for fulldome that get better over time.

“We designed an apparatus that works in blender as a fulldome camera. It is a reflective hemisphere camera that uses a ray-tracing render pass to render a 360 degree-by-180 degree picture of a scene. In simple terms, it makes a fisheye in one render step. You could make a scene in Blender and then fly a camera through it, play it as a video file or run live through it using the Blender Game Engine. We use it primarily to make pre-rendered shows.”

Ott’s recent production, The Nature of Science, has been licensed to about 10 planetariums and released in a DVD version for schools, and is being well received. The 20-minute pre-rendered show was fully animated in Blender.

“It took three months of working about 60 hours a week to get it done,” notes Proctor. “They gave me an office and a computer with a 30-inch monitor, so I was pretty happy.” Ott recently presented a short demo at SEPA that was fully produced in Blender. “We’ve produced content up to 4k resolution, and we’ve had success on a wide range of equipment.”

Planetarians and media producers interested in learning Blender for fulldome can attend Ott’s summer workshops, or hire them for an in-house training session. The workshops are weeklong, hands-on intensives. “They go from knowing little or nothing to having produced several minutes of finished footage,” says Proctor. This next summer there will be two consecutive sessions, a beginner’s workshop June 8-12 followed by an advanced session June 15-19. The session pair will be repeated the following month, July 20-24 and 27-31.

Homegrown in Nebraska

Learning to use new digital tools is a challenge that Jack Dunn of the Mueller Planetarium at the University of Nebraska-Lincoln readily embraced. But then, Dunn also built the planetarium’s fulldome system himself—a spherical mirror projection system put together with guidance from Paul Bourke of the Western Australia Supercomputing Project (part of the University of Western Australia at Perth). Like many planetarium operators, Dunn is used to wearing a lot of hats, and trying new things.

Dunn is the first to point out that the full-dome material he produces for the Mueller’s 32-foot dome, combining animations and images from scientific sources such as the Hubble Telescope with “amateur astrophotography” and other imagery, is not aiming for the kind of production quality of the bigger budget pre-rendered shows. But it serves the goals of the institution.

“You can do a lot with beautiful 2D images using the ‘Ken Burns effect’—panning and zooming. For the viewer or audience to see those images covering the whole dome is...
quite different from seeing them flat.”

“I'm a staff of one and I don't have a staff of animators,” says Dunn. So far he has worked mostly with Adobe Premiere and After Effects. He is looking ahead to improving his production capabilities and output by learning Blender, and by partnering with nearby King Middle School, where Dunn’s colleague Jack Northrup has set up a render farm for student projects (Dunn and Northrup are, respectively, president and executive secretary of the Great Plains Planetarium Association).

“We've discussed a project in which the students would take an old slide program and render some of the images into fulldome,” says Dunn.

The Mueller kept its opto-mechanical star projector, a Spitz A4. “I tend to use the fulldome system for playing clips and movies, and the star projector for the night sky,” says Dunn. “I'm running outside programs [licensed pre-rendered shows] but I also put together clips.” A recent piece he assembled centers on Clay Anderson, the first Nebraskan to become an astronaut.

“His very well known in the state now, and people like seeing his pictures. I did a short piece showing him, his flight, and a collection of the pictures he took of Nebraska from the space station.”

Dunn is upbeat about fulldome but acknowledges the learning curve. “Planetariums still have to adjust to some different ways of producing programs. I did a lot of homework to look at what would work in my theater and what I could afford.

“One thing I'm really happy about is the dome master standard that allows us all to start out with something that makes sense. In the days of slide projectors and the older systems, there was a huge variety of hardware setups and no formatting standard at all. Dome masters allow me the potential that the show will look essentially the same as it did for the producer.

“What it comes down to is that fulldome is just another tool. I'm totally fine with the fact that I'm not going to be able to create a show that has the graphics power of someone with a big budget and a lot of animators. It still has to be about telling a good story.”

Dunn noted that the Western Alliance of Planetariums will hold its 2010 regional conference in Omaha next August, and there will be a side trip to the Mueller Planetarium.

About animation and storytelling

“Planetariums have always done their own thing in the past. They still want to do that moving into fulldome, and a lot of them have the capability. It is a different technical skill set, but it is still really all about being able to craft and deliver a good story,” says Brad Thompson, lead animator at Spitz Inc., which provides the SciDome system (about 50 installations to date) and also offers a library of pre-rendered shows such as The Zula Patrol: Under the Weather.

Thompson cited the National Space Centre in Leicester, United Kingdom, which has a Digistar-3 system, as a good example of a planetarium that has honed their in-house abilities and is now turning out world class shows such as Big and Astronaut. Spitz provided some initial training when the Centre first purchased its fulldome system. “They had the right kind of people on staff,” says Thompson.

Thompson’s observations back up Jack Dunn’s example. “A place with very small staff needs multitalented individuals. What you produce may not necessarily be a show that is distributable on a large scale, but still a great show that will work very well in your local market.”

Frequently the operator of a new fulldome system will start out using the real-time tools to develop shows, then start experimenting with creating pre-rendered shows. “You have to know some kind of animation software, and how to go from the pictures in your head to the pixels on the screen,” he says. “But it is not an insurmountable task—and there are tons of new graduates with degrees in digital media, so it is also not difficult to find help.”

If the show is being created for distribution, it must be rendered to a high resolution such as 4k by 4k, which requires large amounts of storage space and rendering time. Other issues that must be considered in media production for the dome are cross-scatter and how to make the most of the immersive qualities. “There's a whole new cinematic language being developed for the dome,” says Thompson, “and there is a place for the smaller producer.”

Once a year, Spitz offers its week-long Digital Institute, an intensive fulldome training course for planetarians and media producers.

Quality, skill and cost

All forms of digital media production and their production communities can gain from cross-pollination, including fulldome. Carolyn Collins Petersen of Loch Ness Productions, a very active provider of fulldome shows, remarks that “Multimedia production today is something that you see produced at many levels of quality and skill. Look at some of the mashups on YouTube. You can see incredible potential. You can also see incredible dross. That's part of the potential of any medium, not just fulldome.

“The theater is not the issue. Ability, budget, time and talent are.”

Some Loch Ness industry favorites are Larry Cat in Space, MarsQuest, and The Cowboy Astronomer. But, “In terms of sales, our most successful fulldome show so far has been Hubble Vision 2” remarks Petersen. She and business partner/spouse Mark Petersen have also traced a learning curve.

“Our first dozen fulldome shows began as repurposed classic (slide-based) planetarium shows. The stories were good but the visualizations needed work to bring them into the fulldome age. We did a lot of animation work on what was essentially 2D artwork. Our new shows going forward will have more 3D animation, etc., but not all visuals are going to come to us as '3D-able.' So, we (and any other producer) will have to be creative about how we show flat 2D images from Hubble, for example.”

What does it cost to create a fulldome show? (Continues on page 19)
Great Fulldome Shows - made in Germany.
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We make it visible
There’s more to the climate change story... and it might come from outer space

Previously on the story of our planet...

The Earth formed. The Earth cooled. Dinosaurs came along and did things that would one day make Steven Spielberg obscenely rich. Then Spielberg himself popped up with the rest of humanity and lobbed so much carbon into the atmosphere, passing aliens in their spaceships mistook Earth for Venus. Or not.

Oh boy, the global warming debate is doing my head in. (I’m trying to think calm thoughts, waves lapping on a beach…). So I was delighted to read this fascinating book which is a much needed counterweight to the carbon theory that is, from my perspective and that of many others, far from proven. Thankfully, Calder and Svensmark’s book is devoid of the four main things (from a long list) that irritate me about the global warming debate: politics, hand-wringing, name-calling, and an over-reliance on questionable computer climate models. It is, instead, a clearly reasoned and compelling story in which the only star is science itself.

On every page I was reminded of the advice that the venerable Gil Grissom gives his team in CSI reruns(fn): “Follow the evidence. Put it in context, and don’t lose perspective.” For me, those last two pieces of advice would radically improve the global warming debate. But I know that won’t happen; politicians have grabbed on to the debate with glee, knowing it allows them to pass laws they would never otherwise get away with. They have no reason to give it up. Prize-winning British science writer Nigel Calder does the very clear and engaging writing, while Danish climate scientist Henrik Svensmark provides a fair amount of the research data that the text describes concisely. Svensmark leads the Centre for Sun-Climate Research at the Danish National Space Centre, and it was he who, in 1996, developed the theory that the long-term flux of cosmic rays largely determines Earth’s weather patterns.

He doesn’t totally discount the impact of carbon; he just believes the effect is negligible in comparison.

**Cosmic rays and the weather**

So just how can cosmic rays affect the weather? Svensmark says that climate scientists are nowhere near close to understanding the physics of cloud formation using current theories. His lifetime of research has indicated that, in recent times as well as far back in geological history, our planet’s wildest climate swings, and many of the softer ones, coincided with Earth being exposed to higher or lower than normal levels of cosmic rays.

He has concluded that the muons which result from the shower of secondary radiation at lower levels in the atmosphere, at 3,000 metres or less, produce the electrons necessary for the sulfuric acid in the air to clump together and form the nucleus around which water, and, hence, clouds, form. And that’s the part where many of his contemporaries disagree with him.

The authors contend that because the sun’s magnetic field, which acts as a partial cosmic ray shield for the Earth, grew much stronger in the 20th century, it let in fewer cosmic rays. And because there were, consequently, fewer clouds in our atmosphere, we’ve experienced the slight warming over the last 50 years or so that’s got everybody and their goldfish in a tizzy.

But chilling can occur, too, according to this theory. The main temperature coolers are the stratocumulus clouds, which sprawl over 20% of the Earth. NASA’s Earth Radiation Budget Experiment discovered that low clouds at altitudes less than 3,000 metres account for 60% of the Earth’s overall cooling, as they block the sun’s heat. And these are the cloud types that react the strongest to cosmic rays which, paradoxically, are at their weakest at that level. The cloud tops then become warmer, reflecting back to space more of the sun’s heat.

My mistrust of long-term computer climate model programs was confirmed when...
I came across one particular eye-opening passage. It revealed that a modeler at the US National Center for Atmospheric Research has said: “Computer models don’t do clouds well - they are perhaps the biggest problem we have in using climate models…”

Excuse me? A climate model that doesn’t do clouds well? Oh boy, let me lie down for a minute. Isn’t that a bit like trying to sell us a calculator that doesn’t do math well? What’s the point? And these are the models that produce the dire predictions that the news media constantly bombard us with. Take note.

Commenting on the CloudSat satellite that was launched last year to study cloud formation, Calder quotes a climate researcher at Colorado State University: “The new information from CloudSat will answer basic questions about how rain and snow are produced by clouds...and how clouds affect the Earth’s climate.”

So with such levels of uncertainty about something as basic and vital as cloud formation, I think the world needs a book or 12 like this!

**Chilling events in the past**

Later we learn that extreme chilling events have occurred nine times since the end of the last Ice Age, 11,500 years ago. Each has been accompanied by a rise in radio-carbon levels and other tracers (such as beryllium-10 and chlorine-36 isotopes) which indicate cosmic ray levels were high during that period.

The geological record also shows sharp temperature falls (leading to a “Snowball Earth”) that coincided with times when the solar system was moving through the Galaxy’s spiral arms which lay in the direction of Perseus, Norma, Scutum, Sagittarius and Orion. The greater density of stars in the solar neighbourhood during those times would have increased cosmic ray levels.

Calder also explains succinctly how other significant periods of Snowball Earth occurred about 700m and 2,300m years ago, during times of intense star birth in neighbouring galaxies that would, again, have raised cosmic ray levels.

The ultimate big picture here, folks, is that there is an approximately 145 million-year cycle to global climate patterns, and this fits closely with cosmic ray flux as frozen in time inside meteorites. A chapter is devoted to refuting the main criticism of the author’s argument, which holds that 40,000 years ago the Earth’s magnetic field became very weak, but the resulting higher levels of cosmic rays didn’t lead to a cooling period.

The authors accept this is the case, but Calder shows how, after much research, Svensmark saved their theory. He proved that the production of the particular type of muons whose influence reaches down to the lowest 3,000 metres of the atmosphere, where the climate change kicks in, isn’t affected by a change in the Earth’s magnetic field. Remarkably, only 3% of them react to the change in flux.

In 2005 Svensmark presided over an experiment at the Danish National Space Centre in which a sealed chamber containing seven cubic metres of purified air quickly filled with clouds created by incoming cosmic ray particles. It all happened at a much faster rate than even his calculations had predicted, which both flew in the face of conventional cloud formation physics and strongly supported his cosmic ray theory.

**Testing for sub-atomic behaviour**

In 2010 CERN will run a definitive experiment to test the sub-atomic behaviour of particles in cloud formation, which should give the cosmic ray theory a much higher profile. Perhaps then mainstream researchers will no longer be able to ignore the data in the way they do at the moment.

But as much as I like this book, it does highlight a deeply frustrating drawback that dogs the anti-carbon theories: all it can present to the public is the science. Now that’s fine for anoraks like you and me, but for the average Joe and Joanne, who don’t want to or can’t understand the science, why, there’s the carbon lobby waiting with open arms to frighten them with alternate foot-age of wild weather. And you know what? None of that footage needs to be of particular storms that were caused by global warming. The simple emotion of the pictures does it all. Why confuse them with the science?

The carbon lobby is media savvy and knows how to play to the image-conscious audience, but all the carbon naysayers have in response are figures on sheets of paper, and that’s not very media friendly. So for many parts of the carbon lobby the pictures take the part of the science, and that depresses me.

But in Calder and Svensmark’s book it’s the opposite, and that pleases me. It’s the book’s main strength.

I’ve read many book reviews over the years (and written a few myself) which end with an appeal to the reader to grace their bookshelf with the title in question. Well, that exhortation applies to this book more than any other I’ve come across. I recommend that you read it even if you think you’ll want to hurl the book across the room after every chapter. (After all, recently I used Zen meditation [well, kind of], strapped myself to a chair, gritted my teeth and watched An Inconvenient Truth, yet afterwards I still felt like testing the DVDs properties as a Frisbee.)

The Chilling Stars got a fair amount of publicity on its publication, so enough of your visitors will have heard of the cosmic ray climate change theory to want more information about it, and I’m sure they’ll expect planetarians to have that information because of the astronomical connection. So, everything considered, this is a classic example of a book that should be a best seller, but will probably be quietly forgotten about while politicians continue to whip the globe into a state of inexplicable paranoia.

(Producing Content, continued from page 16)

“We get that question a lot,” says Petersen. “The answer is the same as what a construction person would ask when you ask ‘how much will it cost to build a building?’ and they ask in return, ‘How big of a hole do you want to dig?’”

The cost of a show depends on such factors as running time, availability of source material, whether the show is 2D, 3D or stereo 3D, who will create the visualizations and what they will charge, amount of research required, who will write/narrate/animate/do the music and what they will charge, and so forth.

“We’ve heard of fully produced shows that cost more than a million dollars to produce and as little as tens of thousands,” says Petersen, “and in-house production budgeting can be complex: a museum or science center may have to count staff salary or overhead as part of a show budget, whereas if an independent producer hires somebody, that gets counted as an expense for the show.”

**IMERSA News**

Scheduled for May 4-8, 2010 at the Jena-
President of the United States Barack Obama, his wife and two young daughters, attended a planetarium show in a portable dome set up on the South Lawn of the White House on October 7, 2009. The event, a star party at the White House, was organized by NASA’s Education and Public Outreach staff in celebration of the International Year of Astronomy. The night was crystal clear, the setting a perfect scene for an astronomical night of wonders.

This remarkable event was requested by the White House to be oriented towards the invited school children from the Washington DC area. Dozens of amateur astronomers, professional scientists, education and public outreach professionals provided a wide range of activities for the Obamas and school children to enjoy. A wide range of telescopes, some as large as 18 inches and as small as 2 inches, covered the South Lawn, many peering at Jupiter, some at double stars, and a couple performing real-time digital imaging. Dr Stephen Pompea, for example, project director for the National Science Foundation’s Hands-On Optics program and one of the developers of the GalileoScope, was on hand re-enacting Galileo’s momentous discovery of the moons of Jupiter.

Crater impact experiments and samples of moon rock provided great activities to highlight the October 9 LCROSS impact on the moon. A scale model of the solar system and a host of hands-on activities were provided courtesy of Stephanie Shipman, manager of Education and Public Outreach at the Lunar and Planetary Institute, Houston, Texas.

The telescope used by the President during his formal remarks was owned and set-up by Derek Pitts, director of the Fels Planetarium at the Franklin Institute, Philadelphia.

The more than 150 school children attending were divided into smaller groups and rotated between the displays and planetarium domes. Providing a cosmic perspective to young children is fun, engaging, and important, and bringing astronomy to the nation’s attention for a brief moment on Wednesday night was the highlight of nearly six months behind the scenes work by NASA educators.

Domes on the lawn

Two domes were at the White House, allowing all of the schoolchildren a chance to see a dome presentation during the 90 minutes scheduled for the activities. Sky-Skan’s inflatable Starlab dome joined Eluminati’s GeoDome, owned by Goddard Space Flight Center. The President and his family visited the Sky-Skan dome for ten minutes. I’ll describe the brief and fascinating encounter in a moment.

Carter Emmart, director of Astrovizualization at American Museum of Natural History (AMNH), developed some core show content material using the AMNH Digital Universe. I ran DigitalSky 2 on a Definiti PDII projection system in the Sky-Skan dome, and Carter ran Uniview in the GeoDome. The overlap between these two applications is, of course, Digital Universe, so that became the focus of the show for both domes with the individual strengths of each system being used for other interactive parts of the presentations. Suzanne Morris, manager of Hayden Planetarium Programs, joined me, and her interactive presentation skills greatly assisted the informal presentation.

This unique night included special guests such as astronaut John Grunsfeld (veteran of three Hubble servicing missions), Sally Ride (first American woman in space), Buzz Aldrin (second man on the moon), and Charles Bold...
In an interesting side note, when Bolden was offered the job as NASA administrator by the President, he initially turned it down. But President Obama convinced Bolden to take the position because of Obama’s vision of wanting NASA to inspire young people again. Bolden told President Obama that if Sasha and Malia (the President’s daughters) don’t have an interest in science and math within a year, he could be fired.

Setting up the dome had its drama. If there were strong winds, I’d requested to have the inflatable Starlab dome under a NASA tent. The day turned out to be perfect—except for strong wind gusts, which caused set up problems for the dome. After an interesting afternoon on the South Lawn of the White House manhandling a wayward dome, I finally got what I needed, and set up under one of the NASA tents. Each of you know the struggle of climbing inside one of these older style domes, so I had little expectation of the President and his family crawling inside it.

“Don’t worry about us”

So what happened in the dome? Following the President’s opening remarks in front of the White House, 25 school children came to the Sky-Skan dome for a show. Five minutes into the show I heard some activity behind me. I turned to see what it was, and there, at my eye level, was the President clambering into the dome. “Don’t worry about us,” he said. “Thanks for coming, sir,” I responded. You’ve all had latecomers coming into your domes, but this was a first!

The Obama family, daughters included, sat in the only space available. The President and youngest daughter Sasha sat three feet in front of me, next to the projector. Melia sat next to me at the console, and Michelle Obama was just behind us. The scene on the dome showed us leaving the Earth. Below was the North American continent, positioned for the time of the star party. The east coast already in darkness, the terminator ran through the midwest, and the west coast in sunlight. Orion and the Milky Way provided an elegant backdrop.

The President asked a question that had come up during their dinner earlier that evening about the cause of seasons. Suzanna gave a great explanation, and I followed with a short demo on DigitalSky showing the changing sun illumination at the north pole of the Earth over a six-month period. Happy with that, I backed away from the solar system, showed recent images from the previous week’s flyby of Mercury by the Messenger spacecraft, discussed light travel time from the Earth to the moon, and across the solar system.

Gradually, Orion slowly distorted its shape as we moved light years away from the solar system. To connect to the young girls in the group, I offered a personal story of teaching my own youngest daughter, Emma, (a little older than Sasha) the shape of Orion by using glow stars on her ceiling for a month, but without explanation. A month later, taking her outside to see if she recognized anything, she immediately pointed to a familiar pattern which she now calls it “my Orion.” Perhaps there will be glow stars on the ceiling of the White House bedroom before long.

As we departed our stellar neighborhood, the Obamas got up to leave, quietly said thank you, and departed to enjoy the telescopes. White House staffers said presidents are not known to spend more than 30 minutes at events on the South Lawn.

The Obamas spent over an hour at the event and the family showed a great deal of interest. With two girls of my own, I know how important it is to expose your kids to science, and astronomy is a great way to do it. In retrospect, it’s clear that the President is interested in encouraging Sasha and Malia, and all young people in science. His pick for NASA Administrator has some interest in that.

It was a singular and distinct honor to have the First Family visit the planetarium dome and a delight to work with everyone involved. Particular thanks are due to Stephanie Stockman, Education and Public Outreach Lead for the Science Mission Directorate at NASA Headquarters, and the many staff who worked on the organization of this event.

Of course no cameras are allowed in a planetarium, so there are no pictures of the President’s visit to the planetarium dome. I have a strong visual memory of that scene of two young girls and their parents curled up on the floor and staring up at the starry sky. The Earth hangs as a beautiful jewel, and a planetarium projector is giving its full performance. This is an image all planetarians can share as we continue our fantastic voyage of educating our audiences, and providing a cosmic perspective to their lives.

☆
Under the Weather

“Sesame Street in Outer Space”
- The New York Times
“Infinite suns exist. Innumerable worlds orbit those suns, like the seven planets orbit our sun. These worlds are inhabited by living beings.”

With these words in 1584, Giordano Bruno foresaw by centuries one of the most fascinating frontiers of current research in astrophysics, the search for extrasolar planets. Also because of this idea, he was accused of heresy.

In the same place where the great Italian philosopher was burned at the stake, the historic square Campo dei Fiori, the Planetarium of Rome presented a public event called “Infinite Suns, Innumerable Worlds” on the night of October 8.

More than 1000 people crowded Campo dei Fiori to attend. The evening started off with the evocative scene of the fire enveloping the statue of Giordano Bruno and a reconstruction of his theories and his ill-fated story by journalist Corrado Augias and music by Fabio Tricomi. Afterwards the focus lifted from the statue up to the sky in order to detect, even among the lights of Rome, the new suns.

Throughout the evening the public was involved in an ambitious astronomical observation: the detection of the transit of a distant extrasolar planet, TrES-3b, in front of its sun’s disk. In a symbolic way, this observation gives finally justice to Giordano Bruno, marking the climax of the International Year of Astronomy 2009 in Rome.

The planet TrES-3b was discovered in 2007 by the Transatlantic Exoplanet Survey (TrES). It can be found in the constellation of Hercules at a distance of about 800 light years from Earth. The planet, about 1.3 times the size of Jupiter, is known as a “hot Jupiter” because its orbit is much closer to its star than Mercury is to our sun.

While the transit was progressing, the scientific staff of the Planetarium, composed of Gabriele Catanzaro, Giangiacomo Gandolfi, Stefano Giovanardi and Gianluca Masi, coordinated by director Vincenzo Vomero, presented a specifically tailored show dedicated to the discovery of extrasolar planets and their surprising features, including the hypothesis of the existence of a “new Earth.”

For this special occasion the square Campo dei Fiori was partially darkened by switching off all public lights for the duration of the event in order to see the stars shine. A few telescopes were set up in the square for a session of public observing after the show, to let the audience take a look with their own eyes at some of the infinite suns (Gamma Cephei, 51 Pegasi, Upsilon Andromedae).

The event was realized with the contribution of INAF (the National Institute for Astrophysics), the patronage of the Municipality of Rome, and the Sovrintendenza ai Beni Culturali of Rome.

Special thanks were extended to ACEA spa for switching off the public illumination and to Auriga spa for providing the telescopes for public observing.

Vincenzo Vomero, Director
Gabriele Catanzaro, Giangiacomo Gandolfi, Stefano Giovanardi and Gianluca Masi
Scientific Curators
Planetario e Museo Astronomico
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00144 Roma Italy
Listening to radio signals on very low frequencies (VLF, 3-30 kHz) is an engaging workshop activity for people of all backgrounds, such as the students of the summer session of the International Space University, which took place near San Francisco in 2009.

After assembling their NASA INSPIRE receiver kit, students were able to listen to the crackling sounds of radio waves produced by far-away lightning. With a good amount of perseverance and a bit of luck, one may also pickup so-called whistlers: they also come from lightning, but the radio waves have travelled through the Earth’s Van Allen Radiation Belts, which modifies the sharp crackle into a long-drawn sound like “pioouuu.”

During a week of advanced training for planetarium animators and presenter, organized by the French Association of Planetariums APLF in the Provençal village of St. Michel-le-Observatoire in autumn 2009, I introduced our participants to this fascinating hand-on activity.

Because of the wonderful electrically noise-free location, we were able to capture a couple of rather faint whistlers, whose origin could be identified as lightning in southern Africa.

The screen-shot of the audio signal analysis (on right) shows firstly a part of a long and strong crackle from a nearby thunderstorm, whose anvil cloud was visible, though neither lightning nor thunder was noticed. Shortly afterward, there came the short whistle, a pure tone starting at 6 kHz and going down to about 4.5 kHz, short and faint, but clearly perceptible in the original sound. The other vertical lines are crackles from lightning in other parts of Europe. Such a rather simple receiver opens the window to a new, invisible world!

The data from the observations in St. Michel may be downloaded from astro.u-strasbg.fr/~koppen/StMichel.

ISU student Marta Vargas Munoz from Madrid, Spain on Mt. Hamilton, California, listening to radio signals from lightning with the VLF receiver she had constructed. Photo by Tawon Uthaicharoenpong from Thailand. Spectral analysis of the sounds from a VLF receiver, showing the long and loud lightning crash from a thunderstorm in sight, followed by a short, faint whistler from southern Africa, and the numerous short click sounds from lightning anywhere in Europe. Photo by author.
The Best Gets Better

Since its introduction in the summer of 2002, the GOTO CHRONOS rapidly became America’s fastest-selling new optomechanical planetarium projector. Its extremely accurate and fast digitally-driven sun, moon, and planet projectors and its beautiful skies made it the number one choice for new construction as well as for refurbishing projects. Planetarians fell in love with the ergonomically designed control console and the effortless live programming it supported so well. And to top it off, not long after GOTO INC developed the world’s first HYBRID planetarium in 2004, the CHRONOS was also "hybridized." What could be better?...

Times Change

The planetarium environment has changed somewhat since 2002. Fulldome video, developed and shown publicly first by GOTO in 1996, has matured to the point where many of the visualizations previously done with slides, film, and special effects projectors can now be done with digital video. And more producers are gaining skill in creating movies for this new medium. But there is still a need for a planetarium projection system that can be operated live by an educator in real time, without requiring pre-scripting.

Planetarians still need the tools to create their own programs which fulfill the needs of their audiences, and to react to new celestial events quickly, or to answer questions immediately. So for many users, fulldome is not enough.

It's brighter!

A totally new star plate technique, paired with state of the art LED technology yields star images that are exactly the same size as the previous CHRONOS’ tiny stars, but are five (5) times brighter! That means the CHRONOS II is now great for domes from 24-50 feet in diameter, and it shows up great with video!

CHRONOS II
The Best Gets Better

See a sample of the new LED CHRONOS II sky at Planetarium Conferences:

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It's green!

Well no, it's still purple, but the CHRONOS II is the world's first full-featured planetarium projector to be 100% illuminated by energy-efficient, extremely long-life light emitting diodes! This means the CHRONOS II consumes about 1/3 the power of the previous CHRONOS. Other benefits of the LED technology are that it runs cooler, thus requiring fewer and quieter cooling fans, and that users can expect at least 10,000-30,000 hours before the LEDs need easy replacement.

It can have a 'real' Milky Way

Besides the standard, independently dimmable, diffuse Milky Way of the original CHRONOS, users can now choose an optional very high-res Milky Way. Imagine 10,000,000 tiny "micro-stars" painting a subtle, very real Milky Way across the dome. Bring your binoculars!

It can cost less!

The CHRONOS II was born to be a HYBRID. This means that the "base model" CHRONOS II concentrates its efforts on extreme accuracy and speed of motions, the ultimate in ease and depth of manual, live control, and a perfect recreation of a pure night sky - but nothing else. The GOTO CHRONOS II HYBRID Planetarium™ system utilizes the power of Digistar to complement the strengths of the opto-mechanical projector, all under the control of a console that puts tremendous versatility at the operator's fingertips.
At Explorer Dome (a mobile planetarium based in Bristol) we wanted to kick start the International Year of Astronomy with a special project. And, considering that our 10 years of experience lies primarily in science outreach for schools, how better to use IYA2009 than to try to unite different schools in far off lands through astronomy education. We wanted to encourage children to look up in the night sky—at the moon, planets and constellations—and realise that children on the other side of the globe could do so at the same time and see the very same things. Distant people united under one starry sky!

A project was developed as a partnership between Explorer Dome and the South African Astronomical Observatory (SAAO) in Cape Town. The plan was to link 5 schools around Bristol with 5 schools in South Africa. Why South Africa? The educational benefit was immediately apparent—linking two countries on entirely different continents born from different cultures.

South Africa is a country with an incredible history and vibrant mix of people. More than 6000 miles away but only a maximum of 2 hours time difference makes it a perfect choice for video links during the school day. Being in different hemispheres, all the children could also see direct evidence of seasonal differences. It is one thing to learn about the tilt of our axis causing the seasons, but seeing similar children bathed in sunshine and dressed in tee-shirts while we are shivering in the snow and rain really hammers it home!

We started at home in Bristol

Five enthusiastic primary schools in and around Bristol were selected and had a free planetarium and constellation workshop with Explorer Dome. Focusing on the science of day and night and why we have different seasons throughout the year, we explored the night sky as seen from Bristol in the winter and then went on a magical voyage through our own constellation mythology.

Along the way we imagined we could fly south at impossible speeds. The North Star dipped out of view beyond the horizon as the sky in the planetarium tilted in a dizzying way as we visited the South African night sky. Here we were able to point out some of the native constellations from South Africa and seeing the familiar patterns at such unfamiliar angles gave a real sense of being a long way away from home.

We wanted to particularly focus on Orion, the constellation that dominates the night sky both here and in South Africa. In the UK it’s known as a winter constellation, whereas in South Africa it appears in their summer. In the UK we see it as an ancient hunter with a belt of 3 stars, a sword hanging from the belt and a shield held up in defense as he battles with Taurus the bull. In South Africa, some legends see the famous three stars in Orion’s belt as 3 zebras, Orion’s sword becomes an arrow that has been misfired from the bow of a hunter (Aldebaran), who is hunting for his wives and family (the stars of the seven sisters).

Seeing as the same patterns have always been seen as different stories by different people, we decided that if the ancients could do it, why can’t we? And so that is exactly what we did. Back in the classroom, using the stars of Orion, groups of children clustered in hives of creative activity as they made up their own new English constellations and wrote stories that were to be sent over to the children in their link schools in South Africa.

This section of the day was my personal favourite. The stories were inventive, humorous and often totally out of this world. The children worked in teams to decide what shape they could see in the stars and then created a story about their constellation that could be taken across the world as a new English myth.

Some of the imaginative new constellations included Orion as “Robinicus,” a massive and terrifying robin from the underworld. One group saw Orion as a wintry ice queen with a ruby ring that froze her enemies on the spot. There were tales of red-eyed box fish, killer Christmas trees, and a kung-fu bunny that ex-
plodes to make the stars.

And so, loaded up with these stories, artwork, huge astronomy-inspired cards and video letters with dozens of questions, I ventured to South Africa early in 2009. We were travelling to a variety of schools from Cape Town city itself to the towns and townships of the Cape Flats in order to include children from previously disadvantaged areas and the poorer communities of Cape Town.

Children are children everywhere

It is fair to say children across the world are very similar, but the structure of the education system is, in many ways, quite different in South Africa. One main obstacle was language. South Africa has 11 national languages and although English is widely spoken, many of the primary-aged students have Afrikaans or Xhosa as their mother tongue and had not yet been taught in English. This resulted in some fabulous miming (though I do say so myself) and much teaching through stories and very simple language.

The astronomy outreach in Cape Town was a lot of fun. We romped through the science of our Earth, other planets and stars and had hands-on activities such as solar viewing through telescopes and constellation drawing, which was a great success.

Astronomy is one form of science that is accessible to everyone—the sky is there to inspire you no matter what your background is or where you live. The children were keen to learn and hilarious to work with. Lively, bright and creative, they were also full of answers as well as their own questions to ask the friendly faces from their UK link school.

We had to laugh on occasion when showing the video letters to the South African schools, especially with questions such as “do you eat lions and tigers?” and “how do you wash?” But the misconceptions that some children in South Africa had about the way we live in the UK were equally typecast: “Do you live in a mansion?” “Have you ever had a Christmas when you didn’t have snow?” “Have you met the Queen or (footballer) David Beckham?”

Of course not all of the questions from the children were off the mark. Most were very thoughtful and the information the children provided about their likes and dislikes of their home city gave insightful glimpses of life in another country. Along with helping to de-

construct stereotypes, the videos were an effective way to build familiarity between the children.

So what happened next? Returning to England, we have been able to revisit the initial schools with astronomy pictures, artwork, and videos from their partner school in Cape Town. It’s obvious that teachers involved would like to gain as much as possible with their southern hemisphere link school, and the children are keen to write letters back, send photos and find out as much as possible about their new found, far off friends.

It is likely that the individual children may never travel to each other’s school, but with external funding it may be possible to do a teacher swap if the schools’ links are maintained. This is the current goal, as both sides would gain so much from the experience—sharing different approaches and methods of teaching common subjects as well as the cultural benefits to the pupils of having such an exotic, international visiting teacher in school for a few weeks.

Continuing beyond IYA

Even though 2009 and the International Year of Astronomy are coming to a close, we hope that future work between the schools could continue. Link-ups during astronomical events, such as transits of the sun or lunar eclipses, could be exploited. With help, the children could work out the distance to the moon by comparing their different views.

Simpler experiments, such as getting the children to draw the moon on a particular night, would show that although we see a different view (we see a face in the moon, but from South Africa the dark patches are at a different angle to look much more like a hare), we do both see the same patterns and both see the moon at the same phase.

Seventh grade students (top) at Aloe Junior School in Mitchell’s Plain, South Africa, share the excitement of learning with sixth grade students (bottom) at Minety Primary school in the United Kingdom. Photos by Shaaron Leverment.

Seventh grade students (top) at Aloe Junior School in Mitchell’s Plain, South Africa, share the excitement of learning with sixth grade students (bottom) at Minety Primary school in the United Kingdom. Photos by Shaaron Leverment.
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Public Understanding of Science is today an established concept. There is even, since 1992, a scientific journal with this name. The concept is usually referred to as PUS. Bauer (2009) has given a 3-fold definition of PUS:

• “Debunking of superstitions, half-knowledge, complete and utter ignorance, misunderstanding and mumbo-jumbo, and virulent memes that give rise to anti-science.”

• PUS is to “improve science literacy, to mobilize favorable attitudes in support of science and new technology, to increase interest in science among young people and other segments of society, and to intensify public’s engagement with science in general and for the greater good of society.”

• “PUS considers common sense as an asset” and PUS research should “chart out the public controversies arising from new developments and in different regions of the world” exemplified by “the impact of the climate of opinion on knowledge production.”

During the planning of Sweden’s first science center, The Futures’ Museum with Kosmorama Space Theater, I gave seven reasons for creating a science center (Broman 1984, slightly revised 2004):

• Give an insight that science is understandable.
• Awaken curiosity.
• Give people the courage to experiment.
• Facilitate public understanding of science.
• Provide preparedness to withstand superstition and pseudoscience.
• Amuse and entertain.
• Provide aesthetic experiences.

Underlying the statements is the notion that PUS is important, which scientists happily believe, and I of course agree, but it is not as simple as that. There are so many different sciences (which, in turn, are divided into many disciplines). A rather popular notion is that “science” is that same as “natural sciences,” but that is not the case.

Again citing Bauer, science also “includes engineering and medicine, the social sciences and humanities, old and new disciplines with clear boundaries, but also...fuzzy trans-disciplinary techno-sciences.” But it may be the case that the public does not need to understand all the different disciplines equally; some are more important than others.

Identify target groups

Identifying the right target groups is important. There are several reasons why public understanding of astronomy might be important:

The Earth is a lonely planet in a vast space, not as crowded as the impression one gets from science fiction movies. For humans to move from a destroyed Earth to another hospitable planet is just impossible.

The Earth is a planet alive with a dead sister and a dead brother. Venus is too hot for life due to too much greenhouse gas, while Mars is too cold due to too little.

Our universe is approximately 13.5 billion years old; the Earth, 4.5 billion years old; and life on Earth, 3.5 billion years old, in sharp disagreement with the holy books of the Abrahamic religions.

Astronomy is a very fascinating science, much more so than the superstition astrology.

A reasonable conclusion is that public understanding of astronomy is important.

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important task of a research project on PUA would be to identify pros and cons in this respect. There are also several attendant questions: What do professionals—researchers, planetarians, teachers—say? How interested is the public—and different target groups—in astronomy, and what do they already know? Which astronomic and cosmologic disciplines are more important than other disciplines?

How can we do it?
There are, of course, several different media that can be and are used in conveying attitudes and knowledge in astronomic subjects: newspapers, TV programs, books, planetariums, interactive exhibits in science centers, lessons in the school. Different media certainly attract different target groups.

For the project to find out is, of course, how planetariums, and possibly adjoining interactive exhibits, can be used. It is not even possible to judge all planetariums the same; there is a great difference between a cozy dome with a live planetarian interacting with the audience and a major planetarium presenting an all-dome show like Cosmic Collisions to a few hundred spectators at the time.

As has been shown by several authors, among them Franck Pettersen in a master’s thesis (Pettersen, 1995), is that a combination of watching a planetarium show and doing experiments related to the show is very useful. Here are two other voices on interactivity:

Michael Spock, former director of Boston Children’s Museum, borrowed the Chinese philosopher Confucius’ proverb as a motto for the museum: I hear and I forget, I see and I remember, I do and I understand (cited in Ott 2001).

William Glasser wrote (1990): We learn 10% of what we read, 20% of what we hear, 30% of what we see, 50% of what we both see and hear, 70% of what is discussed with others, 80% of what we experience, and 95% of what we teach.

An important component of achieving PUA is likely to be interactivity and hands-on experience, and useful environments for this are science centers and planetariums. Some examples of this are shown in four photos from the Teknoland outdoor science center (2000-2001): yourself a sundial, astronauts’ scales, walking on the moon, and Kepler’s dance.

A research project proposal
An interdisciplinary and international project on PUA is proposed, with the hub at Strömstad Academy. It should include both research on the importance of PUA and the impact of methods to achieve PUA. Let me know if you would like to participate! The Strömstad Academy web site and my email address are found at the top of the article.

Several Science Communication master students as well as a number of teacher students at Dalarna University have, during the last decade, written their theses on the impact of planetarium visits and experimenting with astronomy at science centers on school pupils in ages 6 to 18. My own starting point will be to summarize and analyze the conclusions from these studies, which I participated in as their supervisor.

References
Pettersen, F. Master thesis on informal learning (unpublished). Results were presented at the 12th Nordic Planetarium Association Conference, Oslo 6-8 October 1995.

Top: Yourself a Sundial. Instead of just looking at the shadow of a stick, you have to find the right stone to stand on to make your shadow point towards the white stone. Next: Astronauts’ Scales. In the absence of gravity, astronauts determine their weight by swinging, attached to a string. Here the same principle is used by Teknoland visitors who measure the time of 10 full up-and-down swings and then get their weight from a diagram. Next: Walking on the Moon. Hanging in a rope from a 10 m (33 ft) high tower, the resulting force from the pull of the rope and pull of the earth’s gravity is approx. 1/6 of the earth’s gravity towards the model of the moon. Bottom: Kepler’s Dance. Visitors follow the orbits of the Earth, planet Mars and comet Encke in the scale 1:100 billion, and they walk in the pace of a Swedish folk tune. Each step corresponds to two weeks in reality, and the walking speed in ordits are in accordance to Kepler’s three laws of planetary motion. All photos by Lars Broman
Knock your audiences over with Two NEW Fulldome Adventures

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Patrick Stewart

Violent Universe
CATASTROPHES OF THE COSMOS
The Taylor Planetarium is a 40-ft dome with 104 concentric seats attached to the Museum of the Rockies in Bozeman, Montana. It was built when the museum expanded in 1988, and was one of the first 20 Digistar digital theaters. We made the upgrade to Digistar 2 some time ago, and have made only minor changes since the initial construction. We are still running 40 Ektagraphic projectors and around 50 special effect projectors, and a small projector in back for video.

The Taylor Planetarium is the only planetarium theater in the state of Montana.

I have always been interested in space, starting with my first astronomy book: *The Stars* by H. A. Rey (better known for Curious George). The first time I ever saw a planetarium show was shortly after construction was finished at the Taylor Planetarium.

The Museum of the Rockies is one of the larger museums in the state, and my family would normally travel to see it twice a year. I remember asking the show operator if he was an astronaut, and if I could work here someday. Every time we would visit I would want to see every show I could. I knocked on the door and asked if I could work at the planetarium when I came to college in 1997, and I’ve been here ever since.

I started college in computer science and entered the planetarium field from that angle. When I started, the planetarium had an excellent staff of three: Director James Manning, Assistant Director Mike Murray, and Technician David Binnewies.

As a student I was able to take a hands-on approach in all aspects of planetarium work, from attempting my hand at art for laser shows, to research for live-night shows, to fixing the upholstery of the chairs. My position today I owe in large part to the guidance of this staff, and their experience in the field that they passed on to me.

Our planetarium runs shows daily, with more shows on the weekends. Each planetarium has its own audience, attractions, and unique situation, and the Taylor Planetarium is no different. Our state is the fourth largest in area, but 44th in population. Montana’s second largest industry is tourism, and that is how many museums are viable. Our schedule expands from Memorial Day to Labor Day, when the majority of our visits are made.

We have roughly 60,000 people through our doors a year, and nearly a quarter of them are students. The state legislature helps with costs for educational trips, and with this program all Montana school groups are admitted to the museum for free.

The museum is also a college-level division of Montana State University. We therefore have to run a variety of shows, for second graders and for physics students, for those who know lots about space and those who don’t know what a planetarium looks like inside.

Our local astronomy club runs through the museum and planetarium as well. The Southwest Montana Astronomical Society does several events around the area, including a star party each summer month in Yellowstone National Park.

Lecture speakers are brought in during the winter months for a variety of topics. The planetarium has run many external educational events as well. The museum rents out inflatable Starlabs to area schools, which we have helped with at times; our education outreach has changed recently from hands-on to more of an enabling approach.

Recently, the name of the game for the university as well as the museum has been “change.” As state budgets decline, so do funding to our facilities. Many of the museum wish lists and upgrades have been put off further. The museum staff has decreased significantly, just as have staffs at other museums around the country.

Our planetarium staff has changed dramatically as well, though it’s been a longer process and on their own terms. James Manning is now the executive director of the Astronomical Society of the Pacific. Mike Murray is the program manager at the Clark Planetarium in Salt Lake City. David Binnewies has gone to work at Bowen Productions, helping to install planetarium facilities. The great minds that trained me have moved on from our small pond here in Bozeman, while the appeal of the mountains has called me to stay.

My challenge is to continue to offer programming which is still scientifically relevant while keeping the theater running. We no longer have a technician at our site, so technology troubles can have longer turn-around times. We are hoping to upgrade to a more modern system sooner rather than later. I have only recently been able to see a modern theater: it felt the same as when I was a kid, seeing a planetarium for the “first time” again.

As tough as change can be, it can present opportunities as well. Recently the museum has changed to a “one price” procedure, and the planetarium is included for the first time. Our numbers have not seen the decline in visitors that the museum in general has. Also, as the focus of the museum has fallen more into line with the university, so too can the planetarium. As a university museum, we can focus more exclusively on science-based programming. We are also trying working to more closely with our university to present current research.

While I always hope to entertain while we educate, I also want to inspire. Perhaps someone will walk into one of our shows and their life’s direction will shape a little differently, just as mine did all those years ago.
Minutes of the IPS Council Meeting  
Salle Sirius  
Cité d’L’Espace, Toulouse, France  
July 4 & 5, 2009

* indicates action items

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

Affiliate Representatives:
Association of Brazilian Planetariums (ABP) - Alexandre Cerman  
Association of Dutch Speaking Planetariums (ADSP) - Chris Janssen for Ad Los  
Association of French Speaking Planetariums (APLF) - Dr. Agnès Acker  
Association of Mexican Planetariums (AM-PAC) - Lee Ann Hennig for Ignacio Castro Pinal  
Association of Spanish Planetariums (APLE) - Javier Armentia  
Australasian Planetarium Society (APS) - Shawn Laatsch for Mark Rigby  
British Association of Planetaria (BAP) - Shaaron Leverment  
Canadian Association of Science Centres (CASC) - Ian McLennan  
Council of German Planetariums (RDP) - Thomas Kraupe  
European/Mediterranean Planetarium Association (EMPA) - Manos Kitsonas  
Great Lakes Planetarium Association (GLPA) - Dave Weinrich  
Great Plains Planetarium Association (GPPA) - John Hare for Jack Dunn  
Italian Association of Planetaria (IAP) - Loris Ramponi  
Japanese Planetarium Association (JPA) - Kaoru Kimura  
Middle Atlantic Planetarium Society (MAPS) - Gloria Villalobos for Steve Mitch  
Nordic Planetarium Association (NPA) - Lars Broman  
Pacific Planetarium Association (PPA) - Dale Smith for Gail Chaid  
Rocky Mountain Planetarium Association (RMPA) - Ryan Wyatt for Dan Neafus  
Southeastern Planetarium Association (SEPA) - John Hare  
Southwestern Association of Planetariums (SWAP) - Linda Krouse

Affiliates not in attendance:  
Ukrainian Planetarium Association (UPA)  
Russian Planetarium Association (RPA)

Guests:
Larry Ciupik - Adler Planetarium, Chicago, Illinois, USA - IPS 2008 Conference Host  
Jon Elvert - Chair, IPS Outreach Committee, and Pennington Planetarium, Baton Rouge, Louisiana, USA, IPS 2012 Conference Bid  
Dr. Jacques Guarnion - IPS Publicity Coordinator and Astronef Planetarium, St. Etienne, France  
Dr. Dale Smith - Chair, IPS Publications Committee  
Ryan Wyatt - Morrison Planetarium, San Francisco, California, IPS 2012 Conference Bid  
Mr. Celso Cunha - President of Rio Planetarium Foundation

The meeting was called to order at 9:00 A.M. by President Tom Mason. Tom greeted the Council Members and guests and introduced Planetarium Manager Marc Moutin of Cité de l’Espace, our host for the Council Meeting. Marc gave a gracious welcome to Council and presented an overview of the facilities and events scheduled for the next two days. President Tom Mason and Council expressed their thanks for Marc and his team’s efforts to provide a beautiful and effective environment for the meeting. Following the introductions of Council members and guests, Tom 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 2008 Chicago, Illinois Council Meeting had been previously published in the March 2008 Planetarian. Secretary Lee Ann Hennig reported that the following addendum was included in the Minutes:  
“It was announced at the Adler Luncheon and in the Treasurer’s Report that Jeff and Diana Bowen donated an additional generous sum of money to their planned gift to IPS. The organization is extremely grateful for their continued support.”

The minutes were approved as corrected.

Treasurer Shawn Laatsch presented the Treasurer’s Report. Council reviewed and discussed specifics of the 2008 Financial Report, the mid-year 2009 Budget, and the proposed 2009/10 budget. The Audit Report of 2008 confirmed that the treasury is in good standing and will be posted on the Council Group Site. Shawn fielded questions about specific items in the budget, including the lower accumulation of interest on the account due to the global financial issues.

The Treasurer’s Report was filed.

As Membership Chair, Shawn reported that total membership as of June 2009 is 677 (252 International Members and 425 United States Members). Regarding the Associates’ Initiative, Shawn reported that 90 people were participants. This was an increase over the 79 listed in the previous year. Publications Chair Dale Smith inquired about the conversion rate of Associates to active membership.

* The President directed the Membership Chair to include that statistic in the Membership Report for future reference. Council will continue to monitor and evaluate this initiative at the Council Meeting in 2010.

The Membership Report was filed.

Past President Susan Button presented the Past President’s Report which will be printed in the September 2009 issue of the Planetarian.

President Tom Mason delivered the President’s Report. This report will be published in the September 2009 Planetarian. Among the topics he highlighted were the following:

Attending the NAMES Conference in Alexandria, Egypt as an invited speaker and experiencing the enthusiasm for the planetarium field in that region of the world.

Participated in a number of regional conferences representing IPS and at other conferences he promoted the desire to work with other organizations on cooperative ventures.

Review of Committee Structure and possible changes for improved communication and effectiveness.

The Past President’s and President’s reports were filed.

Affiliate Reports

Written Affiliate Reports were reviewed and Affiliate Representatives highlighted

(Continues on page 39)
Earth, our only known haven for life, inhabits a special place in the cosmos. But how special? Sigourney Weaver guides audiences on an immersive excursion that will inspire a new perspective on our home world. After a close look at Earth, *Fragile Planet* visits the planets and moons in our solar system in search of hide-outs for life, and then takes in our ongoing exoplanetary exploration and extragalactic discoveries. The visually intense program uses the latest visualization techniques to weave together observed data, including high-resolution satellite and spacecraft imagery, terrain maps, and pinpoint positioning of stars, exoplanets, and galaxies. Weaver’s sensitive narration provides a poetic counterpoint to the rich visuals, and renowned giant screen composer Michael Stearns creates a deeply evocative multi-dimensional sound environment. Produced by the Morrison Planetarium at the California Academy of Sciences in collaboration with the National Center for Supercomputing Applications (NCSA) and SCISS AB.
more to explore

Introducing DigitalSky 2
Release 2 for Definiti theaters!

With updated imagery, new data sets, and dozens of new presets, you’re getting more to explore than any other fulldome software.

The new data is real-time too. No need to wait for rendering, because you can explore right now at full resolution! And if you need to render to fulldome frames, use the new DigitalSky Renderer for up to 8K resolution.
An amazing view, all in real-time

This page features just a few of the real-time features in Release 2. And although this page is static, in a Definiti theater the images are full of movement! Sky Touch particles (shown here as green, white, and blue) flow with real wind current forecasts. The asteroids you can see at the top are all dynamic, allowing for the study of the effects of gravity from nearby large bodies. Even the beautiful new 3D Aurora shimmers in real-time.

**new data sets:**

- **Interact! for Definiti:** Over a dozen teacher-tested, unique activities to effectively teach students key concepts using the planetarium
- **WorldView:** GIS plug-in features ultra high resolution layers for Earth, Moon, Mars, Venus, and more
- **3D Earth Aurora**
- **3D Rainbow**
- **Sky Touch Forecast:** Features Earth atmospheric winds, created using new FloVIS plug-in
- **Updated 3D Spacecraft:** HST, Shuttle, New Horizons, Voyager, Galileo, and Pioneer
- **Cosmic Ray Showers**
- **Protein Data Bank Support**
- **Sample DNA, Nanotube, Bucky Ball, and Amino Acids**
- **70 Additional Solar System Minor Moons**
- **Nearly 400,000 Dynamic Asteroids**
- **646 Dynamic Comets**
- **Over 1,000 Dynamic KBOs**
- **Simulated Gort Cloud**
- **All Known Exoplanets With Dynamic Motions**
- **3D Orion Nebula**
- **Volumetric 3D Milky Way With New Spitzer Spiral Structure**
- **Messier Object Images**
- **Cosmic Ray Shower Source Galaxies**
- **Volumetric Galaxies**
- **SkyClass Galaxy Survey v6**
- **Milky Way + Extra Galactic Digital Converse 2009 Updates**

**new features:**

- **DigitalSky Renderer**
- **Integrated Script Assistant**
- **Script Editor Re-designed**
- **Drag and Drop Media Distribution**
- **Multiple Simultaneous Camera Views**
- **Internationalization Capabilities**
- **Updated Star Profile Editor**
- **New Real-time Presets: Three Solar System Sets, Two Constellation Sets, Messier Set, Updated Digital Universe, DS Basics, and More**

DigitalSky 2
Release 2
Available Now For Definiti Theaters

Digital Universe by DigitalSky 2 is a partnership between Sky-Skan and the American Museum of Natural History.

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From Earth, the Sun cannot be looked at with human eyes. 3D SUN gives audiences a chance to see the Sun up close in startling 3D. Stand above the arctic circle and witness the most brilliant auroras on Earth; take a ride on a solar blast from Sun's surface to Earth's Magnetosphere, and come to a deeper understanding of what this vast sea of fire means to life here on Earth.

For Sky-Skan's exclusive fulldome version, the original 3D animation files have been accessed, adding spherical stereo cameras and re-rendering each scene to take full advantage of the fulldome environment.

3D SUN for fulldome is no mere spherical transform but a completely custom scene-by-scene reproduction.
(Council, continued from page 34)

events and concerns from their respective reports. In news from the floor, several affiliates reported numerous activities and events highlighting the International Year of Astronomy. It was noted that several new installations and renovations of facilities around the world were underway or completed since last Council meeting, but there was also the realization that closures and cutbacks to facilities is still an issue. Highlights from the Affiliate Reports will be posted on the IPS Website.

Conferences

IPS 2008 Chicago Conference

Larry Ciupik of the Adler Planetarium presented the final report on the 2008 IPS Conference. Larry pointed out some of the issues associated with hosting and organizing such a large conference, for example: scheduling for vendors and speaker presentations presented some challenges and the need to establish guidelines for scholarships regarding conference attendance. Council will continue to address the conference process and challenges that are inherent for the host institution. Council expressed its gratitude to the Adler and its staff for an outstanding conference in 2008 and will call upon Larry and previous hosts to continue to provide guidance and suggestions for improving our conferences.

IPS 2010 Alexandria Conference

President Tom Mason gave an account of the latest plans and communication from Dr. Omar Fikry of the Library of Alexandria, Egypt regarding plans for the June 26-30, 2010 IPS Conference. No representative from Alexandria was able to attend the Council Meeting, so a telephone conference was arranged in order for Council Members to discuss the proposed budget, registration fees, vendor issues, hotel/conference accommodations, and conference events. The conference call included Dr. Fikry and Dr. Hoda El Mikaty. Council addressed the central question of a large deficit within the budget proposal. *After much discussion, Council requested that the hosts submit a revised budget detailing steps to address the specific issues. Deadlines were established for the hosts to work with the Finance Committee on resolving the budget questions and documentation of specific issues relating to other items regarding the conference. *The Finance Committee will report back to Council in October on progress in resolving the budget issues.

Conference Bids IPS 2012

As a follow up to the IPS 2012 Conference Bids that were presented in Chicago, the following representatives gave updates and answered questions relating to their proposals:

Ryan Wyatt, Morrison Planetarium, San Francisco, California USA. The dates for the San Francisco conference would be August 5-9, 2012.


Following the presentations, Council discussed the details of transportation, location, expenses, venue details, and other conference specific issues.

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 a candidate for the IPS Technology and Innovation Award were presented to Council for consideration. The approved candidates will be presented to the membership at the IPS 2010 Conference. The committee brought up for discussion the issue of presenting the Technology and Innovation Award to companies as opposed to individuals.

The Guidelines in the Standing Rules, Appendix A, Section C. IPS Technology and Innovation Award presently state:

1. IPS Technology and Innovation Award shall be bestowed, from time to time, by the Society upon an individual, institution or commercial vendor whose technology and/or innovations in the planetarium field have been, through the years, utilized or replicated by other members and/or other planetariums.

Although there is some relationship between companies and individuals, it was the consensus of the Awards Committee and Council members that the impetus for awarding this recognition should speak to the individual's contributions to the field more than the company's.

* Shawn Laatsch moved that the guidelines be revised to state that an individual, not an institution or commercial vendor, be eligible for the award, Ian McLennan seconded and Council approved. The revised guideline now states:

1. IPS Technology and Innovation Award shall be bestowed, from time to time, by the Society upon an individual, whose technology and/or innovations in the planetarium field have been, through the years, utilized or replicated by other members and/or other planetariums.

* Council approved Chair Lars Broman's suggestion to Council that all future award recipients be presented with the Swedish crystal glass sculpture.

Elections Committee

President Tom Mason presented the IPS Elections Committee report on behalf of Chair Steve Mitch. Steve will be stepping down from the Chair's position and is retiring from his position at Oglesby. Council acknowledged the important role Steve has played over the years as Elections Chair.

* The President announced that Martin George will be named the Chair of the Elections Committee.

Past President reminded Council that it was important for Affiliate Representatives to encourage their members to consider running for an IPS office and to assist the Elections Committee in the search for qualified candidates.

Publications Committee

The IPS Publications Committee Chair Dale Smith reported on the activities of the Committee.

Executive Editor Sharon Shanks completed her third year in leading the cadre of associate editors and improving the scope and quality of the Planetarian. On behalf of Council and the membership, President Tom Mason will express our gratitude to the Executive Editor for a job well done in the face of some hardships she had to deal with this year.

Upon the resignation of Fran Ratka as Advertising Coordinator, Dale will continue to cover this aspect of the operations until further notice. The Publications Chair will be proposing rate changes for advertising - the first such change since 2003 and also a change in policy with respect to advertisement placement. Dale reviewed the proposed revisions with Council and was encouraged to continue this work with final review from Officers and the Executive Editor.

The IPS 2008 IPS Conference Proceedings are being prepared by Larry Ciupik and will be distributed in the near future. Preparation of the 2009 Edition of the IPS Directory is in production and will be available later this year.

Special Publications:

Nine Science Communication Masters Theses (Lars Broman, editor) was distributed in CD format in the March 2009 Planetarian and all student authors received complimentary copies.

The IPS Astronomical Songbook (Jon Bell, Editor) will be distributed in the September 2009 Planetarian.

Dale discussed the plan of posting archival PDF versions of publications documents on the IPS Website in the Members-Only area. Council considered the issues of secure access, storage capacity and time frames for posting these documents. The Publications Committee will work with Chair Alan Gould and the Website Committee to address concerns associated with the postings. An item of unfinished business regarding the Publications Committee is the feasibility of offering an e-version of the Planetarian. The Officers and
Dale will work together to insure that there is a solid fiscal case for consideration on an electronic version of the Journal.

Chair Dale reminded Council that the Planetarium is the members’ journal and that we need the members’ talent to be an integral part of our publication, so please encourage participation in this endeavor.

Dr. Jacques Guarinos, IPS Publicity Coordinator, spoke about the mission and goals of this position under the IPS Publications Committee. He will be targeting two objectives: (1) What can IPS do that no one else can do regarding planetariums, and (2) Raising the profile of IPS in areas where the organization is not known.

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 Website.

Education Committee

Past President Susan Button presented the report on behalf of Chair Jack Northrup. Jack and the revamped committee are working on several projects, including lessons for IYA, review of existing planetarium lessons from members, and collaboration in producing, evaluating, and testing materials. The establishment of a digital workspace for the committee has improved collaboration among planetariums and overcome some of the geographical limitations from the past. Susan described a grant application to develop a program “The Sky Up There” to create a new genre of planetarium productions (fulldome) and to evaluate the implementation of such programs by professionals in the field and to research the effectiveness of such programs and their outcomes. This is a major effort to conduct research and improve understanding in the utilization of full-dome environments. There are many other aspects to the study, so this will be a project that will be observed with much interest by the Education Committee. The Officers will sign a letter of support to the Grant Committee and Council agreed to this action.

Fulldome Committee

Chair Ryan Wyatt gave a verbal report on the IMERSA organization. There was some discussion about the role of fulldome as an entity of IPS and overlapping goals in the planetarium field. Ryan felt that the focus on technical issues, professional development, and best practices in the fulldome community were the primary objectives. Past President Susan Button expressed the hope that IMERSA will continue to work with IPS to seek ways to collaborate and cooperate in addressing planetarium issues. President Tom Mason commented that he sees a parallel or comparative situation with how the Portable Planetarium community operated in the past as an isolated group, but has now become part of the broader planetarium community in its association with IPS. Although there are particular segments of the industry that IMERSA may be interested in that may not be relevant to the traditional planetarium functions, there is sufficient overlap that provides common interest among these groups.

History Committee

Historian John Hare reported that scanning of historical documents continues: 4000-5000 images are currently archived. John will be seeking assistance in identifying people and places in some of the images. DVD’s containing images of IPS conferences and Council meetings (from 1986-present) were distributed to the Officers and Publications Chair to begin a review of some of the archives.

International Relations Committee

President Tom Mason presented Chair Martin George’s report. The committee has drafted a document with guidelines addressing scholarships for IPS Conferences and has also compiled a list of actions that IPS can address to assist planetariums under threat of closure. These two topics will be considered under New Business.

Outreach Committee

Chair Jon Elvert presented the report on Outreach efforts. Much of the business of the committee has been focused on the IYA celebration and Jon has posted quite a bit of material on the IPS Website. ABP Representative Alex Cherman attended the IAU meeting in Rio de Janeiro as an invited speaker to present an IPS update on IYA. RDF Representative Thomas Kraupe suggested that IPS try to strengthen our collaborative ties with ESO and build on the momentum from the IYA celebration.

Planetary Development Group Committee

Council reviewed the written report submitted by Chair Ken Wilson.

Portable Planetarium Committee

Chair Susan Button highlighted a few topics in her report. The “Week in Italy Contest” has been expanded to include planetarium educators from any American planetarium as well as STARLAB facilities. Susan wanted to make the membership aware that there has been a resurgence of the “Home Planetarium Association.” The committee will produce a CD containing a collection of planetarium lessons from the “Week in Italy Contest” (1996-2009). Susan stressed that although we may have a variety of “tools” in our profession, in order to be effective in their use with our audiences we are required “to support research on best practices and to keep ourselves up-to-date on the current findings in science content and research.”

Professional Services Committee

There was no submitted report from Chair Mike Murray, so Council reviewed the document, “Planetarium Operations and Management” which was posted on the Committee Page of the IPS Website in March of 2009.

Script Contest Committee

At the 2008 Council Meeting, the Committee Chair was directed to work with EMPA Representative and Eugenides Foundation representative Manos Kitsonas to revise the rules and guidelines for the contest and present it at the next Council Meeting for approval. Chair Thomas Kraupe presented a proposal revision of the Script Contest on which he and Manos have been working. In an effort to increase participation and to encourage a broader appeal to audiences in terms of utilizing recent trends in technology, the Committee suggested several changes to the contest approach. The two major revisions included the following:

* All scripts remain the author’s property, but the IPS retains the right to publish them in the Planetarian and/or upload them on its Webpage for IPS members viewing only.

The purpose of the competition shall be the creation of a script that could be used for the development of a digital fulldome show for a target audience of your choice (for example: children, general public or school groups of a certain age range) on any science related topic.

Council reviewed and discussed the proposal. The major change from a traditional planetarium format to a fulldome format brought forth some suggestions on how to appeal to all authors in terms of encouraging participation from all venues even if the program was intended for a fulldome facility. The intention of the committee’s revision was based on the following premise: the idea was to avoid limitations in the script which might occur due to specific equipment installations and encourage the participant’s creativity to its full potential.

Council felt that a stronger statement should be made which clarified the reason for that philosophy and the fact that it did not preclude the potential value of the script’s adaptation to a traditional planetarium.
Council have been applied, seconded by Susan Button and approved by Council.

Strategic Planning Committee
Chair Tom Mason discussed with Council his assessment of the direction of the Strategic Planning Committee. He stated that it is essential to keep the structure of the Society transparent, democratic, and accountable. The Committee recommends that a watching brief be kept on the strategic direction of the IPS.

Based on the broad and diverse membership of IPS, the effect of instituting fee increases for professional members of an officer group, or a professional secretary/director, or any combination of the management scenarios that have been considered before would not be trivial. The inevitable consequence of those choices would result in greater expenses for the membership and the committee does not think that is sustainable at this point. Council discussed the Committee’s report and several suggestions were offered to provide partial funding to support the Officers interim meeting between Council meetings.

The main forms of communications relating to IPS business by the Officers are conference calls, SKYPE conferences, and e-mail. To date, these short meetings have been made at the Officers’ own expense and usually in conjunction with attendance at Regional conferences. The Council was in agreement that by limiting some funding for officer travel in conjunction with Society business, the ability for some of the membership to consider candidacy for an office might be a deciding factor.

* Dale Smith moved that Council authorize financial support for Officers’ travel for an interim meeting for Council Business at a rate of 1/3 the airfare and 1 night’s lodging (extent of reimbursement will depend on the funds available as determined by the Treasurer and the Finance Committee), Thomas Kraupe seconded and Council approved.

Technology Committee
Chair Karen Klamczyński’s report included information on the committee’s work on a glossary of terms to be posted on the committee’s webpage. Karen is also seeking members for the committee.

Website Committee
Chair Alan Gould’s report was reviewed. Updates continue to be posted on the committee webpages as well as special documents as the situations arise (Position Statement on the Role of Planetariums, for example). The IPS Google Map Project is nearing completion of Phase 1. A successful web-based IPS election was held in the fall of 2008. Alan and his committee will continue to work with the Publications Committee and the International Relations Committee on overlapping projects. Council discussed the short and long term goals of updating and modernizing the website and investigating other web-related services that would complement our electronic presence.

Ad Hoc Committee Reports were filed.

Constitution Matters
Council will continue to monitor the need for any adjustments in the By-Laws and Standing Rules. There are no new items to be presented at this time. All revisions voted on in 2008 were approved and now incorporated in the updated version.

Unfinished Business
1. Council will review the Proposal for Guidelines on Scholarship Funds in support of conference attendance, and submit their comments via e-mail.
2. Council will review the draft document from the International Relations Committee concerning a policy/action statement for addressing the issue of IPS Support for Planetarium in Under Threat
3. The Officers will ask for review of a draft proposal on readmission of Inactive Affiliates
4. An Action Item list of Council Business from this meeting will be sent to Council members for review and comment by October 30.

New Business
The Council vote on the IPS 2012 Conference Bids was held on the second day of the Council Meeting in order to allow Council Members time to consider the bids and formulate follow-up questions after the presentation on the previous day. Each of the potential sites held unique appeal for our membership and offered a variety of experiences during the conference. After much discussion, Council voted to have the Pennington Planetarium in Baton Rouge, Louisiana host the IPS 2012 Conference. The Morrison Planetarium in San Francisco was encouraged to re-submit a bid for a future IPS Conference.

Council is now accepting bids for the IPS 2014 Conference. The deadline for bids to be submitted for the 2014 Conference is June 25, 2010 the first day of the IPS Council Meeting in Alexandria, Egypt.

Membership Chair Shawn Laatsch brought up the topic of retired members inquiring about a reduced dues schedule. After some discussion, * President Tom Mason directed Shawn to come up with a more detailed proposal addressing the issue since it would require more consideration and discussion from Council than time permitted at this meeting.

President Tom Mason will pass on the contact information of a person interested in giving star talks in planetarium facilities as he travels through various regions.

CASC Representative Ian McLennan announced that he, Thomas Kraupe, and John Hare would be working on a presentation to honor the IPS members who have passed on during the lifetime of IPS (since 1971).

IAP Representative Loris Ramponi suggested that President Tom Mason post a Council Update (video clip) on the IPS Website.

Project Reports
Shawn Laatsch reported that Two Small Pieces of Glass traditional planetarium show was distributed free to all IPS members and the digital fulldome version was made available at a small cost to cover hard drives, re-mastering, and shipping expenses. The 400 Years of the Telescope PBS program, the planetarium program and an ASP kit of activities were well received. James Hughes, Dan Malerbo, and Frank Mancuso of the Buhl Planetarium, Shawn Laatsch of the Planetarium at Imiloa Astronomy Center of Hawaii, and Kris Koenig of Interstellar Studios were involved in the production of the planetarium program. Kris Koenig, Executive Producer/Director, Anita Ingrao, Assistant Producer, and Dan Koehler, Executive Producer of Interstellar Studios were involved in the PBS Television Program. The show has been translated into a variety of different languages by IPS members.

IYA celebrations continue to be popular and widespread among the planetarium community. President Tom Mason encouraged Council to keep current with promoting and documenting their participation in the global effort.

For the Good of the Order
Council thanked Alex Cherman for his appearance on behalf of IPS at the International Astronomical Union’s meeting in Rio de Janeiro.

President Tom Mason thanked the Council for their efforts on behalf of their affiliates and the general membership of IPS. On behalf of Council, Tom once again expressed thanks to Ryan and Jon for their work on the bid presentations. Lastly, he acknowledged Marc Moutin and his staff for their hospitality in hosting the Council.

With business completed, Shawn Laatsch moved to adjourn the meeting, seconded by Lee Ann Hennig, and approved by Council. Respectfully submitted,

Lee Ann A. Hennig
Executive Secretary, IPS
July 5, 2009
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Dear Colleagues

I am writing this in the departure lounge of Manchester Airport after two days at the Yorkshire Sculpture Park, where I took part in a two-day weekend public project called “Dark Skies.” I was invited to attend by Bradford-based Space Connections, who organised the event, and I represented both IPS and Armagh Planetarium.

The experience for the participants was enhanced by the volunteer support, including those from the local Sheffield and Huddersfield amateur astronomical societies and a portable planetarium team who showed the classic starry skies. Friday was devoted to a workshop with primary and secondary school teachers, where I tried to show them how astronomy was a super “hook” which could be used to prime children’s interest in science, technology, engineering and maths.

In the UK this is known as the STEM agenda, which has funding support from central government and many aspects in common with similar programmes around the world. I used a number of images and small electronic gadgets and toys which I used to show how to capture pupils’ attention. The feedback from the teachers was very positive, as they could see that with some very simple and inexpensive kits they could easily stimulate lots of classroom discussion about how, for example, spacecraft could be designed. The demo really emphasised that using infrared and ultraviolet sensors immediately broadened our sensory boundaries, and clearly showed how little of the electromagnetic spectrum we humans actually can see using our hard wired biology.

Richard Everiss from the Yorkshire Planetarium set up a 3D projection system demonstrating astronomical video and deep space images processed and programmed by Swinburne University in Australia. The Space Connections travelling WOW bus was also available for the teachers to see.

Saturday started as a rather murky grey day, and volunteers set up a trailer with a simulated Lunar landscape to be explored with small robots. This allowed the children to see how they could plan the exploration of neighbouring planets using very expensive small autonomous machines.

I set up a plasma ball with fluorescent tubes to show how static electricity was powerful enough to make the tubes light up when we used small people in the circuit design acting as switches.

As I finish writing this, I am reflecting on how even the smallest children are fascinated by the apparent magical attraction of rare earth magnets strongly sticking to each other with such force that they are very hard to separate.

At my table I had two fist-sized NiFe meteorites, and the magnets really stuck to them also. Just for comparison I had a couple of rather nondescript looking chondrites and they also showed the weak magnetic attraction typical of their kind. Even though I encased the magnets in plastic coats to prevent the magnet’s surfaces actually touching, it is a tough job to pull them apart: I guess it is the invisible power as these strong magnets repel and attract which is the “magic.”

As one of the 3D shows ended, an avalanche of excited small people exploded from the doors and besieged my table: it was a birthday party with two young lads having a joint celebration. I showed them how the static charge from a plasma ball leaks into the air, but can be channelled through them to earth, and if we insert a fluorescent tube into the pathway, I can convert them from humans into voice-activated switches. (Think about it!)

They are all clamouring for a turn at making the plasma spark follow their fingers and to trying to shock each other with the static electricity. We are not mentioning maths, engineering or anything else, but I know that demonstrations like this can powerfully fire youngster’s imaginations out in a brightly lit corridor. How much better to show them constellations, planets, spectacular deep space objects and all the other fabulous things in the universe in the controlled darkness of the planetarium.

Even in the foggy conditions, the Sheffield amateurs are using a solarscope to let them look at distant trees. Once again the actual expected outcome is less important than the hands-on experience. Telescopes are experience instruments; hours of talk and diagrams cannot beat the personal use of eyepieces, focusing and defocusing, lens changes, tracking motors and all of the paraphernalia of imperfect observing conditions. How do you explain in words the experience of having telescope tubes freezing on to your hands on frosty winter nights?

The teaching instinct is to strive for perfection, but as the Yorkshire day was very misty and damp, my static electrical experiments become unpredictable. On the other hand,
ASTRONOMYTHS
Where the Sky Ends, the Myth Begins
A DIGITAL PLANETARIUM SHOW

“Astronomyths far exceeded my original expectations. It offers our audience a look of naked-eye astronomy as well as the modern views of various Deep Sky Wonders, mixed skillfully with the appropriate ancient Greek myths. This is an excellent show that will draw crowds year after year.”

“It does a beautiful job of incorporating mythology and the science of the constellations/stars.”

“Your show fills an important niche, that is currently vacant when it comes to full-dome shows.”

“This winter we played the show 4 times a day. We run a survey and approximately 90% of the audience loved the show. They found it powerful and realistic comparing it with theatrical movies. Thank you!”

Make a lasting impression. It matters!

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To open this article I would like to thank those who sent emails concerning the vocabulary used during a planetarium show. Several of you included information that started a discussion of the transition of qualitative and quantitative measurement.

My favorite qualitative to quantitative transition was, “gravity pulls you down” should change to ‘gravity is an acceleration of 9.8 m/s² in a negative direction’ at about 12 years of age.” We started a conversation on what skills or mental frameworks are in place so that the student understands the meaning of the expanded definition.

If you have other vocabulary or qualitative to quantitative transitions please send me an email.

Moving on to the topic at hand, education: where my last column was focused more on the visitor learner, this article is focused mostly on you. Yes, I am talking to you: the planetarian who is racking your mind to come up with your New Year’s Resolution for 2010.

My suggestion is for you to resolve to learn. There are a few ideas for you to get around to finishing, or see about continuing your education. Keep an eye on dome-L and the other lists for classes, workshops, and conferences that are coming up during the year. These are not only great opportunities for you to learn, but also to network with others.

Speaking of networking, many planetariums, in their multiple roles in the running of the planetarium, also are in charge of their websites. I decided to look at website additions that may catch your interest and answer prospective visitors’ questions. I have been visiting many planetarium websites and other online presences (Twitter, Flickr, Facebook, or Blogspot) to see what educational content or connections were available. It was very interesting type in planetarium at Twitter to see what would pop up, and there they were, announcements from the planetariums about presentations and events. I also was able to find a healthy number of tweets from visitors asking about presentations that they are going to or have been.

Several of the tweets included links to additional information or to Flickr to show pictures from an event. I traveled over to Flickr to see what would happen if a potential planetarium visitor types in just the word “planetarium.” The search results were mostly pictures of planetariums from an architectural point of view. There were a few pictures star projectors of the past and present. One of the Flickr links I followed was on a planetarium’s webpage that connected to a gallery of pictures from an IYA2009 event. I was impressed that it was evident that the planetarium was aware of child privacy issues and did not show faces, just back’s of heads.

My next stop was Facebook. If you type in planetarium and choose “pages,” a list of planetariums will appear that you can become a fan of. Even as a browsing visitor you can see information about events or interest pieces. I thought it was interesting that some of the postings made by the “planetarium,” staff members, and visitors addressed some of the questions planetarians always get asked at the end of presentations. I was impressed with the variety of sources that were used for informing the public about astronomy, as there were links to news articles, videos, and podcasts.

The last group of modules I saw in use was for blog/discussion boards. Planetarium staff members would start the blog post about an astronomy topic or a specific question and just wait for the responses to roll in. On the discussion board side, people could post a question on the page and leave an email address (only visible to the planetarium) and when the planetarium personnel replied to the post it was also emailed.

I have used a blog and discussion board on my webpage for several years and I have observed that students who may not feel comfortable in asking a question at the planetarium may be alright with submitting the question online.

A third type of board that you may see is a wiki that be used to organize links to additional information to general topics. Most people have had some experience with wikis in the past, but not in the setting up of one. An open wiki is set up so that the owner has given permission to visitors to read pages, edit or write pages and delete pages. There are many different varieties until you get to the closed wiki, where the owner only permits visitors to read the pages.

I have put together a table (below) as a quick reference for understanding the rights and permissions that I have observed on several web pages.

Just a quick review of your homework until the next article: Resolve to Learn. Also, if you are interested in contributing to the discussion on vocabulary and qualitative to quantitative transition, please send me an email.

**A web of activity**

The lesson plan for this article is quick-set-up-take-back-to-school for an information web. This activity is done when the students return to their classroom after seeing a planetarium presentation. The example pictures are from one that was made after a presentation on black holes and quasars.

**Lesson Plan: Bulletin board web kit**

- **Materials:**
  - Yarn, about 12 meters
  - 3x5 note cards with a hole punched in the corner, 40 needed
  - Letter-sized sheet of paper with the topic of the planetarium show on it

(Continues on page 47)
Being the reductor of the Forum column in the *Planetarian* was is very new and unusual thing for me. I thank Sharon Shanks and everyone who has sent a response to the first question for their attention and trust.

In general, this year brought in a lot of new things, including the economic crisis, from which we are all so tired. By the way, Russia, among all the G20 countries, suffers from it more than anyone, and the economic crisis has played its tragic role in the development plans of planetariums in my country. The economic situation has forced us to look for other ways to attract visitors and organizing events. So what ways? This was the question for the December Forum:

The world economy today is making it hard for everyone. What suggestions do you have for keeping planetariums open? Be creative.

Planetariums need to take an active role in the community. Look to the institutions or government bodies that have oversight of your planetarium—what are the activities, charities, and community projects that are receiving funding and popular support from them? Is the head of your school board involved in other community projects? Does the chairman of your museum sponsor a fundraiser for charity?

If you don't know the answers, then do some research. Once you’ve identified community efforts that do receive popular support or support from key community players, then volunteer yourself and the planetarium for those efforts. Even if you can't find a way to do that, seek out efforts that are popular in the community at large and then become an active player. At the very least you will be building a group that you can reach out to when it comes time to ask for support of the planetarium. Get involved at the planning phase if possible so that you have lots of face time with the principal players. If the community, and the community leaders, know that the planetarium is involved with the efforts that are important to them, they will perceive the planetarium as being an important asset to the community.

Then, when the time for budget cuts comes around, hope that they will find it easier to cut the budget of a stranger, than to cut the planetarium.

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I think it’s important to turn to the exact meaning of the question. The current social and economic situation is indeed associated with the term “survive.” Survive means resist to something that surrounds you, try to swim up to surface, despite to the fact that your feet are tied to a heavy stone of problems and difficulties.

In the last year at Nizhny Novgorod planetarium, there have been many events that were very interesting and important for the development of our institution and its visitors. And, in my opinion, one of the most important is striving to understand how to use most effectively the resources of a unique multidisciplinary and multi-purpose facility for the construction of “bridge” between major academic science and society.

In what kind of shows, promotions, master classes and workshops we should talk to the person about the latest developments in science of Earth and the universe?

This conversation is often difficult. And our task is to share with each other to the forms and methods which successfully passed the test on the launch pads of world planetariums.

Visitors of ours shows don’t just want to know about how our universe is arranged. People ask more questions about philosophy of life in general. Looking at the dome of the planetarium, the audience wants to talk, to feel, to experience. Obtaining new knowledge, people try to change themselves. And this is the most valuable thing that we can give to those who visit the planetarium.

Yet even in the situation of the surrounding economic crisis and declining issues, the themes of the Earth, of the universe and of humanity are the themes that help us to “live” instead of just “surviving.”

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1. Never rest...blow your own horn! Regularly send out press releases to the local media, announce planetarium coming attractions before and after each presentation and maybe start a planetarium or night sky update blog or radio spot.
2. Have a presence on the web... make your website informative and unique.
3. Build on and continue providing special events/days/activities developed for IYA2009.
4. Create a theme for each month of the year and build your activities around those themes.
5. Nurture connections and design events that highlight local organizations, libraries and companies.
6. Capitalize on the planetarium’s unique appeal for weddings, concerts, speakers, storytellers, team building courses, professional development, scout groups and sleep-overs. These activities can bring in revenue.
7. Create competitions for all ages and sectors of your community.
8. In short, become an indispensable part of your community.
9. Do some grant writing.
10. Create shows/video clips/ animations and sell them.

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Expand your audience and supporters by going beyond the “confines” of our glorious universe. The technology and experiences of digital planetariums and fulldome venues are enticing to the enormous new media and gadget-obsessed communities. Market the technology and unique experiences domes allow. And increase your programming with some special screenings of DomeFest 2009 or the
DomeFest Retrospective to draw attention, funds and production support from the media-minded members of your community.

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Again, I thank all my friends who sent their responses and hope that their number will only increase.

Now that DomeFest and fulldome have been mentioned, I would like to share some impressions. From the moment when I became enveloped in the sphere of fulldome digital production in 2007 (when I actually introduced it here at my planetarium), I asked myself “why are planetarium shows in general so repetitive, highly specialized and often done using not high graphics and art levels?” At DomeFest 2009 I saw the potential of the digital dome with cutting edge projection technology in the sharing of many creative, musical and artistic talents and overcoming boundaries that surpasses anything else in the media today. And my question for new issue, for the new year, carrying new hope is:

Is it possible to expand the sphere of application of a planetarium’s digital dome, and what can help to do that?

My emailbox is open for your answers.

(Education, continued from page 45)

Paper clips, 40 needed
Objective: Students will create an information web after the planetarium presentation.

Procedures:
Use a stapler to attach the yarn to a bulletin board in an abstract web pattern. In the center of the board attach the letter-sized paper, which will be the foundation point for the web. Each student or pair of students will write on a note card one of the following items:

A two-sentence summary of one part of the presentation
An important fact (in sentence form)
A picture (drawn) of something that happened in the presentation

The reasoning behind the three different types is that by limiting the length of the summary, students have to look at sentence fluency and word choice. Facts that are written in sentence form are less likely to be misinterpreted. Simply writing “4” as a fact could mean “There are 4 seasons in our area of North America” or “There are 4 electron bonding sites on a carbon atom.” The drawing of an image from memory moves information between the hemispheres of the brain and helps the student retain the information.

Students will then hang the card on the web by the paper clip through the hole. Webs do not have to be organized into a pattern, but the students will at times try to make chains of information.
Unless you've been living in a cave for the past few years, you're probably quite aware of the proliferation of the so-called "social media," that is, web sites and online services that allow personal and professional networking and virtually unfiltered communication between anyone with an Internet connection.

MySpace, Facebook, and Twitter are probably the most prolific services, although there are countless others. MySpace and Facebook both allow for the creation of member "profiles" which provide basic identifying information about an individual member and their interests and serve as a platform by which they can meet and interact with friends, and network with friends’ friends, and so forth.

Twitter is based less on individual profiles and more on short 140-character messages—"tweets"—that disseminate news, information, or, more commonly, purely random thoughts to people who opt to "follow" a particular Twitter member’s tweets. Twitter aggregates the “followed” tweets into a timeline so a Twitter user can see, at a glance, what his or her friends are up to at a particular point in time.

Although the social media “movement” began largely with high school and college students looking to connect with each other in an online environment, businesses and organizations have recently recognized the viral power of social media and it appears that informal education venues are no exception.

A recent search of both Twitter and Facebook for museums and planetariums revealed dozens of institutions using social media as a way to inform the public, connect with visitors, and extend the reach of the institution’s mission beyond the physical confines of the institution itself.

Despite the rapidly growing use of social media as a bona fide way to engage the community, many organizations and institutions remain skeptical or, at least, cautious about jumping in. Larger, more bureaucratic organizations, such as state universities, generally have very clearly defined channels through which external communication must flow before it can ever be released.

The fast-paced nature of social media, coupled with its participatory characteristics, is often at odds with the traditionally accepted principles of external communication that call for carefully crafted statements and talking points, leading to difficulties in launching social media.

In this installment of General Counsel, I depart somewhat from the usual legal perspective of this column and offer some thoughts on using social media. The idea for this topic came from a recent discussion I had about legal issues in using social media. As a heavy user of such services—namely Twitter and Facebook—and having some experience developing social media plans for organizations and companies, I thought I might expand the scope a bit and offer some general thoughts on using social media, generally, lightly peppering the discussion with institutional and legal issues, as relevant.

Everybody can see you...

Perhaps the most important feature of social media platforms is that just like a web site, everyone on the web can see what you post. This may sound elementary, but I have often been amazed at the type of things people post on social networking sites that are clearly intended to be directed towards certain people, apparently forgetting that it's in plain view for the whole world to see.

For institutional use, which presumably involves posting content that is clearly intended to be public, this is unlikely to be an issue, but as it’s a key aspect of social networking, it was worth mentioning.

Again, just like the web itself, social media is, for all practical purposes, permanent. That tweet you issue today will still be there—somewhere—years from now. The next generation of political candidates and nominees will undoubtedly face questions about the things they posted on their Facebook pages or their Twitter accounts! Again, for institutional use, it’s unlikely that this feature of social networking will raise issues, but it’s a worthwhile feature of social media to keep in mind.

Have a plan

One of the biggest problems I see in connection with institutional social media use is the lack of a thoughtful plan for how to best leverage it. Social networking is essentially another tool in your communications toolbox. Just as you would never issue a press release or develop a brochure without thinking about its intended purpose, you must consider how best to use social media in view of your overarching communication objectives.

Too many organizations and institutions rush to establish a social media presence and then essentially abandon it, or update it so infrequently that it quickly fades from relevance. Before launching a social media initiative, think carefully about how you plan to use it, the content you plan to include, and the way you plan to leverage the unique bilateral aspects of social media to enhance your image and educate the public.

Social media audiences are savvy, and seek more than just online ads. The content posted on social media platforms must be relevant, informative, and reasonably compelling. It is certainly appropriate to use your social media tools to promote upcoming shows, exhibits, lectures, and other happenings, but to truly add value to the user experience you would be well advised to develop value-added content—perhaps a daily update on what one can see in the night sky, astronomy news, links to interesting space and astronomy related web sites, online chats or interactions with astronomers—to help maintain a compelling and relevant social media presence.

For example, as I was writing this paragraph,
the University of Reno (@UNRplanetarium) planetarium tweeted about the Orionid meteor shower; and just a minute after that, @WIAstronomy, an astronomy club, tweeted a link to video of a solar storm.

Who’s job?
As you might have guessed from the last couple of paragraphs, keeping up with a social media initiative can be time intensive. It is, therefore, important to establish early in the process, who within the organization will be responsible for holding the keys to the social media kingdom, and that the person or people tasked with the project are on board.

Many businesses tried to incorporate social media responsibilities into existing positions (without, of course, adjusting compensation commensurately), which led to all sorts of morale problems and a poor social media showing; getting everyone on board early on in the process is essential to a successful social media plan.

Related to the point above, because social media is essentially another communications tool, what you say and do with it represents your institution. Accordingly, the person or people responsible for maintaining the social media presence should be limited to those whom are appropriately familiar with the institution’s communications objectives and whom are appropriately positioned to respond to inquiries, and are sufficiently trustworthy.

Hanging with the right crowd
One of the major virtues of social media is also one of the major drawbacks. Social media participation allows users to engage in bilateral communications with other participants. While this can lead to vibrant discussions and effective dissemination of information, it can sometimes lead to less desirable interactions.

For example, one can imagine a planetarium posting images of, say, the moon landing, on its Facebook page, and a third party coming along and adding his or her comments about the landing being a hoax, etc. As the owner of the institutional page, you can remove those comments, but keeping on top them can be a chore. The moon landing example is, perhaps, a bit trite, but it illustrates the point.

Many institutions have communications departments or other institutional bodies that are responsible for crafting all institutional communications. While the policies vary from institution to institution, you ought to be very mindful of the policies and procedures in place in connection with external communication. These policies sometimes require pre-clearance of any materials that will be circulated outside of the institution which may be a drawn-out, bureaucratic process.

In some extreme circumstances, the bilateral, spontaneous nature of social media serves as an absolute prohibition to developing a social media presence; in others, it simply means that you have to be very deliberate in developing a social media plan to ensure that the communications department is on board.

Build a wall
Keep your personal social media presence entirely separate from your institutional presence. This is probably easy to do in the context of a planetarium or science center, but many professionals (attorneys, photographers, etc), sometimes blur the line between their personal social media use and their professional use.

Keeping these two separate will help maintain the appearance that the institutional presence reflects the views of the institution alone, whereas your personal site allows you to express your personal views which may differ.

That’s it for this issue. As always, I hope you find the tips in this column useful. As always, I look forward to your feedback, particularly on this column which takes a decidedly less legal tone. Feel free to drop me an e-mail, or, better yet, find me on Facebook at www.facebook.com/chrisreeddc or follow me on Twitter@chrisreeddc.
Now that I am emeritus from Dalarna University, I have more time for “extracurricular” activities. IPS and NPA, environmental politics, Strömstad Academy, my company Teknoland, and the Human Ethics Federation, as well as officiating at secular weddings, welcoming ceremonies for babies and funerals.

I recently officiated at my first funeral ceremony in a long time. The ashes of the deceased old man were to be spread in a memorial park, closing his ecycle, but I also talked about his being part of the cosmic cycle, as we all are. I talked about how the solar system and the Earth were formed over 4 billion years ago and life on Earth, over 3 billion years ago, developing into the myriad of life forms our planet hosts today. And how, in the distant future, maybe 5 billion years ahead, our sun will explode and create a growing nebula, which will include also the atoms and molecules of the former life on Earth, a nebula that might be part in the creation of a new solar system. From stardust you came, and stardust you again will become.

The International News column is dependent on contributions from IPS Affiliate Associations all over the world. Many thanks to Ágnieszka Acker, Bart Benjamin, Ignacio Castro, Gail Chaid, Alexandre Cherman, Alex Delivoriais, Martin George, John Hare, Nataliya Kovalenko, Shaaron Leverment, Ad Los, Loris Ramponi, and Alexander Serber, for your contributions.

Upcoming deadlines are 1 January for Planetarian 1/2010 and 1 April for 2/2010. Anyone who wants to contribute news from parts of the world where IPS has no Association (see p. 3) is welcome to send it to Martin George, martin@stromstadakademi.se.

Association of Brazilian Planetariums

The digital wave is sweeping Brazil! After its first two digital planetariums opened last year (Rio de Janeiro and Feira de Santana), a third one is being installed in Florianópolis, the capital of the beautiful state of Santa Catarina in the South of the country. As in Rio, it is a Digistar 3, from Evans and Sutherland.

Talking about Rio, Brazil’s largest planetarium had two glorious weeks in August while serving as co-host of the International Astronomical Union General Assembly. Since the planning stages, back in 2007, the Rio Planetarium has a permanent seat on the local organizing committee, and when the GA actually happened, the Rio Planetarium was there for them. And, of course, the IAU was there for the planetarium.

The Rio Planetarium held public talks from eminent astronomers from different countries. They all had simultaneous translation, courtesy of different consulates that were more than happy to help their countrymen and women. The Rio Planetarium also hosted, at a lovely 19th century palace owned by City Hall, an open bar reception for IAU members and a special planetarium presentation at the Carl Sagan Dome (double feature: Two Small Pieces of Glass and In Search of Our Cosmic Origins for astronomers from all over the world. But the most talked about event was the soccer game (Flamengo versus Corinthians, the two most popular teams of Brazil) at Maracanã stadium, on 9 August.

On the last day of the IAU General Assembly, the Rio Planetarium inaugurated its latest project for dome occupation, Stars on Stage. It mixes live presentation from musicians and comedians inside the dome with the beautiful Zeiss Universarium star field and a short lecture from one of their resident astronomers. The project lasted till November, and will certainly be back next year.

The Association of Brazilian Planetariums held its annual meeting at Feira de Santana, the second largest city in the state of Bahia. Feira de Santana has two independent planetariums; one of which has a modern digital system from Zeiss. The ABP had a representative from the federal government talking at the opening ceremony. And, for the first time ever, they had vendors from three different countries showing their products to Brazilian planetarians. It almost felt like an IPS meeting!

On a different note, ABP would like to congratulate the City of Rio de Janeiro, host city of the 2016 Summer Olympics. As a branch of the municipal government, the Rio de Janeiro Planetarium will be part of the parallel events organizing committee, bringing astronomy to a broader audience.

Association of Dutch-Speaking Planetariums

The Planetarium of the Royal Observatory of Belgium has installed a brand new digital planetarium, introduced to the public on 23 October. They choose the RSA In Space System in combination with Barco SIM 7Q LCOS projectors. Because they decided to integrate the two systems, the opto-mechanical Zeiss and the digital, this made it not at all easy for Barco to place the projectors. The solution was to place them at the outside of the dome, with 6 projectors for the panorama and 2 for the upper part of the dome.

The decision to keep the opto-mechanical Zeiss has been thor-
oughly discussed, since it was not obvious for the installation of the digital. But when knowing that their UPP 23/5 (second model of Zeiss) was made for the World Exhibition of 1935, they can proudly say that is the oldest optomechanical projector still in use. An advantage is that the Zeiss gives the dome the space look that is so loved by the public.

This gigantic project was made possible by a donation of the Minister of Science and extra financing from La Loterie Nationale and La Banque Nationale de Belgique. The first full-dome show they presented for the public was ALMA, In Search of our Cosmic Origins. The other existing programs have been adapted to the new digital system and will still be used for the school public and during holidays.

In 2003 the Artis Planetarium in Amsterdam finished a special show about Arab astronomy and the astronomical background of the Ramadan called Moon and Star. It was a beautifully illustrated story in an atmosphere of 1001 Nights. With the switch to a digital planetarium in 2007, the show became outdated. However the Planetarium recently digitalized it and added new animations. This year, at the start of Ramadan, the show premiered again. The Arabic community in Amsterdam has a special interest in the program and it is often booked by Islamic schools. The planetarium staff hopes to show the program at the IPS Conference in Alexandria next year.

Association of French-Speaking Planetariums

The APLF is increasing in size. A special welcome to two new eminent French-speaking members: Jon Elvert from Louisiana, USA and “Pierre” Remus Cirstea from Romania. Projects for new planetariums are emerging near Saint-Omer and Grenoble. A superb Palais de l’Univers was opened in Dunkerque on 10 October.

During 20-26 September, an APLF training course was organized for 16 planetarium animators at the Centre d’Astronomie near the Haute-Provence Observatory (OHP). People attended from various cities in France as well as from Romania and Germany.

Lectures were given by specialists on the history of astronomy and of planetariums, on the apparent and true motions of stars, planets, and the moon; on astrophysical parameters and stellar evolution; and on galaxies, expansion of the universe, and dark matter.

Each astronomer presented updated results with their uncertainties (for example, the Hubble constant could be of 72 ± 5 km/s or of 65 ± 5 km/s). Using the OHP-80cm telescope, Jupiter’s diameter was measured by interferometric techniques and Fourier transform equations.

But the week was dominated by two main themes (1) A workshop on spectrometry leading to the construction of a CD-rom spectrometer and of a simple radio antenna showing the whistles from South Africa. (See related story on Planetarium Magazine, as shown by the contents (translation by Laurence Demond):

Culture, a rampart against the crisis? Agnès Acker
From a closed world to the infinite universe, Françoise Balibar
AMA 09 in Planetaria
ALMA show: happiness and tribulations, Agnès Acker, Henri Boffin
The Cité de l’Espace: colors of the Moon in 2009, Marc Moutin, Christophe Chaffardon
The little Planet: a very modern co-production, Muriel Bernard
Deep Sky, André Amossé
Planetaria celebrate IYA 09
The first digital planetarium in Romania, Remus Petre Cirstea
Extreme rotators in the universe, Christophe Martayan
Last mission of the Hubble Spatial Telescope, John Stoke
URSS-USA, the cold war of space, Didier Schreiner
Keys for the future viability of Planetaria, Ed Lantz
Cosmic State: astronomy and politic theory, Nicholas Campion
Astronomy is everywhere, Steve Tidey
A planetarium in the Astronomy’s truck, Patrick Brandebourg
Astrocollège in Querqueville, Nicolas Arnaud
Twenty years serving the science in Bretagne, Philippe Adrian
Astronomical Contests in Slovakia, Marian Vodovenec
The LSS-Planetarium, Yves Lhoumeau, Lionel Ruiz
The Stratoscripts stellarium, Lionel Ruiz
The 24th APLF conference, Didier Mathieu
Meeting of small numerical planetaria in Marseille, Yves Lhoumeau
The spring of planetaria, Didier Schreiner
Plant is born in Italy, Loris Ramponi
Protection of the night sky: a citizen action, Florent Baileux
The diary of planetaria

It was a very busy year in 2009 for APLF’s Planetariums Magazine, as shown by the contents (translation by Laurence Demond):

Culture, a rampart against the crisis? Agnès Acker
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The diary of planetaria


Association of Italian Planetaria

The Italian astronomer Mario Cavedon recently passed away. He was born 6 April 1920, and died on 1 June 2009. He was the senior of Italian planetarians and founder of the Italian Association of Planetaria. In the past he was director of Milan Planetarium, the largest planetarium in Italy. More information is available at the page www.astrofilibresciani.it/Planetari/Cavedon_Mario.htm.

The year 2009 has been a landmark year for astronomy popularization all over the world and particularly in Ravenna. It has been the first year that our astronomy club, ARAR, has run the Civic Planetarium on its own. Many activities have been arranged to tie in with the International Year of Astronomy (IYA2009), but the following could be highlighted:

On 7 June, the Italian Foundation of Round Table set up a Children’s Day in the Public Garden where the Planetarium is located. The goal of Children’s Day was not only to let children play and enjoy themselves, but also to learn in special educational corners which had been prepared.

The organization also managed fund-raising activities in support of a parent association (AGEOP) which is devoted to assisting children affected by cancer. The Planetarium was operating during the day, and many amateur astronomers had set up their telescopes to observe the sun and were at the disposal of the public to answer any questions. Others worked as lecturers under the Planetarium dome, and all procedures were managed by Round Table members to support fund-raising for the AGEOP association.

On 21 July, a special show was organized in the Planetarium dome to celebrate the 40th Anniversary of the first moon landing. Members of the public were entertained by astronomers, poets, musicians and journalists on the theme of that remarkable day in the history of mankind. For many people the events of that day four decades ago were like a dream come true; they were able to switch on the TV and see a man walking on the moon. For this reason the show appealed to both the hearts and minds of the many people assembled there.

On 12 September was the opening ceremony of a book exhibition managed by Biblioteca Classense (Public Library), the Council and the Planetarium. The title of the exhibition was Ciel di Carta (Paper Skies) and 28 books of ancient astronomy, from the 15th to 17th century, were on display. Authors such as Galileo Galilei, Copernicus, Newton, Kepler, and Tycho Brahe had their books exhibited on the table. It was a great opportunity for visitors to speak about astronomy with well-known lecturers and to share in the fascinating history and culture preserved by the Public Library.

Association of Mexican Planetariums

Antonio Sanchez Ibarra, former AMPAC President, (2005-2007), died on 13 September 2009 of a heart attack. Born in 1955 in Nogales, Sonora and a self-taught astronomer, he devoted his life to many astronomical activities and science teaching endeavors. In 1972 he founded the Nogales Astronomical Society, actively participating in the installation and operation of the Guillermo Haro astrophysical observatory in Cananea, Sonora. He conducted research on solar astronomy observation and collaborated with the Kitt Peak National Observatory. In 1990, he formed the Astronomy Area at the Center for Physics and Astronomy Research at the University of Sonora, putting into operation the Solar Observation Station. In 2000 he was awarded the National Prize of Science and Technology Diffusion given by the Mexican Society for the Diffusion of Science and Technology.

He was a key element in the development of the Constellation Project Planetariums group in the State of Sonora and of the astronomical information web net of the University of Sonora TV web site cosmosastro.son.mx/webtv, an invaluable source for astronomical information to complement the educational role of many planetariums. Ibarra was well known in Mexico and Latin America for bringing a flow of space astronomy news through interviews and printed media to the public, who would later on visit planetariums or local astronomy clubs seeking more information. He always transmitted in a very accessible way the wonders of the Universe to children and adults and fostered their interest in studying it.

On the brighter side of news, AMPAC held a model construction contest called From Earth to the Moon to build dioramas, Apollo rocks, etc. in commemoration of the 40th Anniversary of the landing on the moon and as an activity of the International Astronomy Year, with elementary up to middle high school students participating, sponsored by 10 AMPAC member planetariums throughout Mexico. Each planetarium awarded their 1st to 3rd place winners. First places were awarded a 60-mm telescope.

British Association of Planetariums

The new website for the British Association of planetariums will be online by the time of this publication. A redesign and redevelopment of the previous website has only taken a few months and was voted as one of the main priorities for the council this year. The new website is a database driven site, with a complicated but user friendly back-end enabling members to log in, access important news and update their own personal and company details which are then displayed on a map for visitors. The appointed BAP website administrator is now able to easily update news, photos and new/lapsed members online which is a great plus and removed the necessity for the website administrator to be fluent in html and asp websites.

This site has cost a sizeable but reasonable chunk of funds in order to get a professional overhaul. However, we see it is well worth the cost and effort as a strong and vibrant web presence is the first and best way to advertise our members, keeping business flowing in to each planetarium across the UK. Have a look at the new website at www.planetarium.org.uk and get in touch with Shaaron Leverment if you have any feedback or queries at shaaron@explorerdome.co.uk.

Have you had similar organizations joining with your associate? In the past the British Association of planetariums (BAP) has been known to hold a joint AGM with the Association for Astronomy Education (AAE). Although recently the two organizations have held separate meetings and drifted a little apart, Leverment (BAP chair) has been offered a council position on the AAE for 2010 as the BAP representative and we hope to tie the two organizations closer due to the similar aims and interests of our members. Perhaps we may yet see a merger in the future to the mighty BAPAE!

Now, in news from members, Steve Blight from Science Dome talks about his recent success in the mobile market and the European
Meeting of Small and Portable Planetariums, and David Ault would like to introduce himself as he will be visiting North America next year with Science Dome: 360-degrees science adventures in a mobile dome, science dome@ntlworld.com.

Since investing in two digital planetarium systems (Digitalis Education Inc.), Science Dome has found its subject content has been able to expand greatly, using Stellarium as a background/overall theme, and showing images and videos on subjects that include geology, environment, physics, dinosaurs, and history. Often an initial astronomy booking at a school leads to another booking with a different subject (but they always bring in the stars and planets a bit). This has involved writing Stellarium scripts, and converting videos where needed, but otherwise technically straightforward, with no additional equipment needed.

Science Dome realized early on that they would have to be willing to travel, so without sacrificing family life too much they stay in an economy hotel and just pass the cost of this and a fuel charge on to the school. Clients are willing to pay for this because of the uniqueness of what they offer. This currently is for about 5% of the bookings. They try to arrange 2 or 3 days away at a time to make it more efficient.

David Ault (jdault@gmail.com), a young presenter from the West Midlands, is planning a tour of North America’s planetariums next year. Astrotour 2010 is an ambitious project to volunteer and present an ordinary night sky as a background/overhead, with no additional equipment needed.

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ical society continued its park tour with telescopes in late August and September.

This fall, the Lakeview Museum of Arts & Sciences planetarium presented a variety of shows, including laser light shows from AVI and Laserdome. The staff is also starting a new series, paired with local wineries, titled Wine, Cheese & Lasers under the Stars. These shows are designed for adults over 21 only. The presentations include a section on the current sky, finding the planets, and, one of their feature selections, the Uniview Experience. Selections from their laser light shows were added later.

In observance of the International Year of Astronomy, the Cernan Earth and Space Center on the campus of Triton College hosted Galileo (played by Mark Thompson) for its annual “Big Event” in August. Members were transported back 400 years to hear the words, wisdom, and music of “the Father of Modern Science.”

Indiana. Chuck Bueter and others crossed the Indiana state line to present astronomy under a dome and under the firmament at the YMCA AstroCamp in Three Rivers, Michigan. Those who stayed up all night saw every planet except Mercury, as well as the recent impact site on Jupiter. Bueter also coordinated a Telescope Renaissance in late August, where people brought their underused telescopes for evaluation and some hands-on instruction, or donated them to other potential users. Results from the Let There Be Night program, which received support from the GLPA, are noted on the 17 August podcast at www.365daysofastronomy.org.

Michigan. At the Kalamazoo Valley Museum Planetarium, after the last program was presented on 5 August, the doors were closed and the power was turned off. The following day, the staff began clearing out the old projection equipment to make way for the new Digistar 4 laser system. The planetarium reopened to general audiences on 19 September with a day of free programs.

Since the D3 SP2 HD planetarium system was installed at Kingman Museum in October of 2008, over 4,000 people have seen a planetarium show or star talk. Many of these people are school-aged children participating in the 21st Century Community Learning Center Program with the Battle Creek Public Schools. Since the 2008 fiscal year, museum attendance is up over 70 percent, membership has tripled, and school group attendance is up, proof that the planetarium is drawing people into the museum.

Kingman Museum hosted a three-day-a-week, four-week-long program for middle school students, who enjoyed a different planetarium show each week and participated in demonstrations and hands-on activities such as making a scale solar system model, writing reflections on planetarium shows, and calculating how high they could jump on other celestial bodies in our solar system.

In Marquette, the Shiras Planetarium had a very busy summer, with many of their shows selling out. They ran the IYA show Two Small Pieces of Glass while handing out free NASA buttons and bookmarks in July and August. As the days grow shorter, they partnered with their local astronomy club to offer additional telescope events to commemorate IYA. They also strengthened their partnership with the local NASA resource center this summer and offered free NASA educational materials to visiting school teachers during field trip visits.

The staff at Southfield’s Vollbrecht Planetarium started its fall 2009 series of eight live 90-minute astronomy lectures/star shows. The staff offered a different illustrated lecture each evening, drawing from 1,000+ digital images, plus door prizes, information handouts, and Q&A.

The Exhibit Museum Planetarium upgraded its projector this fall. Moving to a much smaller and lower Canon projector alleviated line-of-sight issues with their current 180x360 lens. In November, the staff offered free showings of the fulldome Our Cells, Ourselves, a short program for National Diabetes Month that covers the evolution of the human immune system and type 1 diabetes in children.

The Cranbrook Institute of Science Planetarium once again hosted a sold-out Astronomy Camp in late August.

The Dassault Systèmes Planetarium in Detroit has been very busy conducting audience surveys of their new sky show What’s Up? Your Guide to the Night Sky. Planetarium Education Coordinator John Schroer conducted a Build Your Own Telescope class with members of the Ford Amateur Astronomy Club, using the IYA Galileoscope kits, along with Wil Tiri-on and Brian Skiff’s Bright Star Atlas 2000.0.

The 4 July Fireworks Fundraiser at the Delta College Planetarium and Learning Center was also a sell-out, for the 12th year in a row. It was also the 12th year in a row that the event wasn’t rained out. Money raised from this event goes into the planetarium’s endowment fund. In October, the Delta College Planetarium hosted the annual GLPA conference.

Ohio. The Cleveland Regional Association of Planetariums gathered for its annual picnic and splash party on 28 June at the home of Bob and Ingrid Sledz.

Dr. Andrew Kerr has left the Newhard Planetarium at the University of Findlay for the Marion Blakemore Planetarium at the Museum of the Southwest in Midland, Texas. Kerr will become curator of Education and Public Events, operating a brand new Spitz SciDome HD in a completely renovated planetarium.

Scott Huggins of Spitz demonstrated the SciDome HD system at a 30 May workshop at the Shaker Heights Planetarium. The demonstrations included Dr. David Bradstreet presenting some of the innovative teaching modules that he has written for the system.

In July, Dayton’s Boonshoft Museum of Discovery hosted JPL’s Scott Lever, mission manager of the MER project. His presentation was an update of the one he shared in Merrillville at the 2006 GLPA conference. Boonshoft continues their popular 3rd Friday Astronomy planetarium programs, each month with a different topic tied to IYA 2009.

The Ward Beecher Planetarium in Youngstown welcomed Curt Spivey to its staff as planetarium engineer. Curt moved closer to family in Ohio with the transition, coming from the Millholland Planetarium at the Catawba Science Center in Hickory, North Carolina.

Nordic Planetarium Association

Nordic and Baltic planetarians met for their biennial conference at Vitenfabrikk (the Science Factory) in Sandnes, Norway 4-6 September. Conference host Ivar Reed Nakken welcomed 20 delegates from Denmark, Latvia, Norway, Sweden, Germany and USA. The conference started with a lecture on Bronze Age astronomy by Professor Per Amund Amundsen, Stavanger University, and continued the next day with Mark Perkins from ASH Enterprises demonstrating the Warped Media projector system, built on a high-resolution Can-
NARRATED BY LIAM NEESON
MUSIC BY RICHARD FIOCCA

THE OTHER SIDE OF INFINITY
BLACK HOLES

Gobbling up audiences worldwide.

Funding provided by the National Science Foundation and NASA
BLACK HOLES: THE OTHER SIDE OF INFINITY is a Denver Museum of Nature & Science production, supported by grants from NASA's Gamma-Ray Large Area Space Telescope project and the National Science Foundation. It is directed by Theodore J. Stepien (University of Colorado) and the National Center for Supercomputing Applications. Science advisors include Dr. Andrew Hamilton (University of Colorado) and Dr. Lynn Cominsky (Sonoma State University). Produced by Spitz, Inc. Approximate 30 minutes. Image: © Darren Moman of Nevada & Science.
on video projector and a spherical first-surface mirror.

Lars Broman from Strömstad Academy presented a new research to be started this fall, Public Understanding of Astronomy PUA. Nakken spoke about Vikings and navigation and Jan Warnstam from SCISS demonstrated the Uniview system for linking several projectors together.

Ann Wagner and Ralf Hasse from Zeiss demonstrated the opto-mechanical + digital projection system in Vitafenfabriken’s planetarium. During the remainder of the day, delegates were brought on a tour visiting the coast line of the area and the old lighthouse Tunge Fyr that used to guide sealers into Byfjorden, the fiord leading to Stavanger.

Additional paper sessions included Per Brovold presenting Digital Starlab and Anne Bruvold talking about “A glimpse into the Sami sky,” based on a young female student’s interview of her old Sami grandmother. Dace Balode presented “Technoannas pagrabi, Riga.” This is a children’s science center with both indoor and outdoor exhibits that opened in 1997. Its 5 m (17-ft) dome had, up to September 2009, a Goto EX-3 projector, when Vitenfabrikken decided to put their Starlab Fiber-arc projector at Technoannas’ disposal for unlimited future time. Finally, Per Broman presented his new science center Backyard Cosmos, www.bakgard.se, in Våmhus, Sweden, and Lars Broman presented Strömstad Academy as a Nordic institute of advanced study and a platform for emeriti professors.

A board for NPA was elected for the next two years with Lars Broman as president, Aase Roland Jacobsen as president elect, Per Broman as secretary/treasurer, and Dace Balode, Anne Bruvold, Snævarr Gudmundsson, Helle Jaaniste, and Timo Rahunen as directors. Reinis Balodis, Jaak Jaaniste, Sakari Lehtinen, Ivar Nakken, and Lars Petersen were selected as deputy members. The membership accepted the invitation by Balode and her colleagues Alvis and Reinis Balodis to have the next NPA Conference in Riga, Latvia 2-4 September 2011.

One of the telescopes made by Galilei is presently on display in the Nobel Museum in Stockholm, Sweden. The Galilei exhibition opened on 9 October, will continue until 17 January 2010, and is on loan from Institute and Museum of the History of Science in Florence.

Per Broman reports that Broman Planetarium is now European representative of ASH Enterprises, marketing and selling their Warped Media all-sky projector system. For more information, contact him at pbr@planetarium.se.

**Pacific Planetarium Association**

Pam Maher, NASA Nevada Educator Resource Coordinator at the College of Southern Nevada, reports they have gained funds to display part of their collection of signed astronaut portraits. These portraits were a donation to “the planetarium” by Ernest Bauer, an avid space collector from Santa Monica, California. The portraits document the missions from Mercury to the Space Shuttle.

After 35 years of service to many thousands of visitors, the Lawrence Hall of Science Hold Planetarium has been demolished. There are preparations for a new planetarium with digital projector in a 9 m (30 ft) dome. They will be experimenting with audience participation with slightly larger audiences. The new dome will have two rows of seats and hold up to 50 people. The seating will be bench seats, reclaimed and refurbished from the old Chabot Planetarium. Staff will experiment with a planetarium touch-screen control available to museum visitors on a drop-in basis the planetarium-as-an-exhibit. Pictures are at lhs.berkeley.edu/pass. For more information, contact Director Alan Gould at agould@berkeley.edu, +1 510 643 5082.

Morrison Planetarium’s second digital full-dome feature, Journey to the Stars, began 26 September 2009. The newly redesigned California Academy of Sciences has been in full operation for one year. Journey to the Stars offers a survey of different types of stars with an overview of stellar physics. It is narrated by Whoopie Goldberg. Over 2 million people have visited the Academy since its opening, nearly 800,000 of which enjoyed the first planetarium show called Fragile Planet. For more information, contact Bing Quock, assistant director +1 415 379 5184 or email bquinck@calacademy.org.

Members of PPA attended the Astronomical Society of the Pacific’s Annual Conference near Burlingame, California, 12-16 September 2009. The emphasis was on the International Year of Astronomy. The 5-day conference excelled in its teacher workshops and the speakers were superior. Jay O’Callahan, storyteller, guided his audience through the half-day sto-

PPA: From left to right ASP educator Suzy Gurton, her son, storyteller Jay O’Callahan, and ASP educator Ann Hurst. Photo by Gail Chaid.

PPA: (Left) Alan Gould discussing the Kepler project and demonstrating hands-on activities; (Right) Karl von Ahnen and ASP Executive Director James Manning at the ASP Annual Conference 12-16 September 2009 in Burlingame, California. Photos by Gail Chaid.
The conference was attended by 156 participants, including leading Russian scientists from the research institutes of Moscow, St. Petersburg, and Nizhny Novgorod, planetarians from Barnaul, Vladimir, Kaluga, Kashi-ra, Kirov, Moscow, Orenburg, Perm, Podolsk, Penza, Tomsk, St. Petersburg, Ufa, Yaroslavl, and Nizhny Novgorod, affiliates of cultural and educational institutions, representatives of the Ministry of Culture of the Russian Federation, Nizhny Novgorod Municipal Administration, and the Government of the Nizhny Novgorod region.

In essence, the conference has become an extended forum for Russian planetarians. In total, over 50 plenary and section talks have been delivered by leading Russian scientists, school and university teachers, and planetarians. The topics ranged from advanced problems in space research to links between modern astronomy and the development of education and culture in Russia.

The conference communicated and highlighted topical issues in revival of astronomy teaching at schools, educating astronomy teachers at pedagogical universities, attracting astronomers and astrophysicists to commissions developing the new state education standards, and the development of the federal concept for the promotion of planetariums in Russia.

The conference program included demonstrations of fulldome shows, in particular the show Two Small Pieces of Glass translated into Russian, as well as visits to the optical observatory of the Nizhny Novgorod State Pedagogical University and research labs of the Institute of Applied Physics of the Russian Academy of Sciences.

According to the initiative by the Russian IYA 2009 Organizing Committee, the fall campaign 100 Hours of Astronomy was organized in a number of Russian planetariums on 24-27 September 2009. The event list included nighttime public astronomical observations.

In the beginning of September, Dr. Alexander Serber, head of the observatory of Nizhny Novgorod Planetarium, attended the International Workshop Astrophysics of Neutron Stars in Istanbul, Turkey and delivered the talk “Revealing the structure of accretion column from energy-dependent pulse profiles of an accreting X-ray pulsar.” In the end of September, Yaroslav Gubchenko, head of digital-technologies department of Nizhny Novgorod Planetarium, attended the International Conference DomeFest-2009 in Albuquerque, New Mexico, USA.

A digital planetarium under a 5-m (17-ft) dome has been put into operation at the Darwin Museum in Moscow. The private company Planeta from St. Petersburg reported the beginning of production and delivery of about 10 mobile planetariums for customers from various Russian regions.

The Vladivostok commercial sea port is finishing the construction of a sponsored school equipped with an observatory and a planetarium with 9-m (30-ft) dome and is looking forward to purchasing the equipment. A new planetarium building is being constructed in Vladimir. According to the architectural project, it will be a part of a large business and entertainment center.

Unfortunately, the construction of a new planetarium building at Yoshkar-Ola is desperately halted. The gap is partially filled using a mobile planetarium. The Bryansk Planetarium is facing troubles again. Upon numerous disputes and even work with a religious association in the same building, this planetarium was relocated from a Russian orthodox cathedral to another building (a center for culture) a few years ago. However, concerns have grown about the structural reliability of that building. As a result, since 1 May 2009 the planetarium delivered only extra-mural lectures. In September, it has been relocated again to a room at an exhibition center under a dome with less than 5-m (17-ft) in diameter.

Southeastern Planetarium Association

Bays Mountain Planetarium in Kingsport, Tennessee will host the next SEPA conference 8-12 June 2010. The theme is The Art of Storytelling. On the agenda, in addition to presentations, workshops, planetarium shows, and vendor displays, are:

• Keynote speaker Dava Sobel, author of Longitude, Galileo’s Daughter, and...
Young Harris, Georgia. The conference center and hotel will be the Brasstown Resort. Young Harris is nestled in the picturesque high-mountain region of extreme north Georgia.

For more information about SEPA please visit the website sepadomes.org.

Ukranian Planetarium Association

The AstroDnepr amateur astronomy club of Dnepropetrovsk Planetarium has been working since 2006. During the International Year of Astronomy 2009 it has been active in a wide variety of projects. The club and planetarium together took part in the international project 100 hours of Astronomy. Club members delivered lectures at schools about the contributions that older pupils can make for development of astronomy, presentations on TV, and sidewalk astronomy observations using telescopes and binoculars of club members and planetarium itself.

In July a very important astronomical event took place: the longest total solar eclipse of the 21st century! Oleg Shilov from AstroDnepr club went for observations to Shanghai, China. Oleg Shilov is a committed astronomy popularizer, a participant of three expeditions to total solar eclipses. On 22 July, Shilov was successful with observations of partial phases of the eclipse. Despite the rain and clouds that prevented him from observing totality, the whole physics of the phenomena was revealed. It was also funny to observe how, with sudden fall of darkness, the illumination of the city turned on automatically, and cars were lighting headlamps. August was a month of the traditional yearly visit to the Odessa amateur astronomy club, Astrodes. Four AstroDnepr club members joined local amateurs at Mayaki observatory and took part in and Astrodes meeting. During this visit the concept of preparation and execution of the Galilean Nights project was developed. Galilean Nights is one of the cornerstone projects of the IYA 2009 (www.galileannights.org). It is to celebrate the 400th anniversary of first telescopic observations done by Galilei and to reproduce them. How to celebrate and conduct this event as a whole city celebration was the main topic of discussion during the Astrodes club meeting.

Back in Dnepropetrovsk, AstroDnepr members started to develop and execute the Galilean Nights project. In August the main concept was announced to teachers of physics and geography during their pedagogical meetings. Master classes for teachers were offered to help them to tune their schools telescopes and to teach them how to find Galilean objects—those objects that were first targets for telescopic observations 400 years ago—in the sky. Oleg Shilov is twice a week delivering a master class in the planetarium, Telescope by your own hands, in conjunction with the Galilean Nights project. This very popular master class is teaching how to construct a telescope similar to the Galilean one from glass lenses.

These numerous small telescopes peered into the sky over Dnepropetrovsk during 22-24 October, when city dwellers were observing mountains on the moon and the Galilean moons of Jupiter during the Festival Moorage. Astroclub invited Jim Wiggins from the United States to join its first meeting after summer vacations, devoted to discussion of summer observations. Jim Wiggins is a traveler, solar eclipse hunter, former staff member of NASA, and computer technologies specialist. Wiggins observed the total solar eclipse in China, but he was luckier with the weather and managed to observe the total phase of the eclipse in full. Wiggins’ visit became a factual start of the public events in the frame of Galilean Nights project in Dnepropetrovsk. The astroclub members attended with him an excursion to the National Aerospace Center, where he told the aerospace school pupils about space flights. During a meeting of the astronomy club Follow the Sun in Pridneprovsk, Wiggins told about peculiarities of solar eclipses.

During excursion to the Mountains and Mineralogy Museum of the National Mountain Academy, the AstroDnepr members presented the museum a collection of meteorites, for celebration of the 110th anniversary of the Academy.

In the frame of Galilean Nights, a project of essays and poetry was conducted in schools, along with a project of drawings conducted by planetarium. In October the Central library joined with a thematic exhibition of The Planets.

- A storytelling workshop led by East Tennesse State University’s Storytelling Institute.
- A nature program at Bays Mountain about gray wolves.
- Live music from noted singer/songwriter Chuck Brodsky.
- A field trip to the Gray Fossil Site, possibly the largest Miocene site in the world; it includes two new species discovered, the red panda and badger.
- A field trip to the Rocky Mount Living History Museum. They have first-person interpretation of 18th century life in East Tennessee.
- A well-known storyteller from the International Storytelling Institute.

The conference hotel also boasts a newly refurbished planetarium with a Zeiss ZKP-4, Spacegate Quinto, 12-m (40-ft) Astro-Tec Ultimate Seam dome, ECCS Advanced LED cove lighting system, and 102 seats from GreyStone International. The conference hotel and meeting facility is the nearby MeadowView Conference Center and four-star Marriott Resort. Registration is expected to be $250, but may be less with increased vendor support. Contact Adam Thanz at thanz@ci.kingsport.tn.us for questions.

The conference site for 2011 will be the Rollins Planetarium at Young Harris College in

SEPA: (Top) The park where Bays Mountain Planetarium is located; (Bottom) the Bays Mountain Planetarium. Photos by Adam Thanz.
books. Many other events and actions did take place as well.

On the topic of the Galilean Nights project, Alexander Prokofiev, president of the AstroDnepr club, published a methodic paper in the September issue of *Physics at Ukrainian Schools* magazine. It describes how to conduct Galilean Nights at educational institutions, in museums, musical theaters and other institutions, and it is strongly recommended to register their events on the website of the project, www.galileannights.org. It will allow others to benefit from ideas and to join to the offered subprojects. Besides, on the web site of Dnepropetrovsk planetarium, www.dneproplanet.dp.ua, information about all news and participants of the project in the city is regularly updated.

Finally, AstroDnepr is also performing scientific work. The more active development has been the topic of archeoastronomy. One of the presentations on this subject got high esteem during the 8th Pan-Ukrainian Open Forum of amateur astronomers, UkrAstroForum, that was held in Kharkiv in May 2009. This is one of the largest meetings of astronomy amateurs of the whole Ukraine.

### International Relations Committee

**Martin George**  
martingeorge3@hotmail.com

If my report in this issue is a little brief, it’s because a great deal of my time has been taken up lately with the establishment of my new planetarium in Launceston, Tasmania! There will be much more about that, including some photographs, in a future issue—but I am pleased to report that we had a very successful opening ceremony on October 12 followed by an amazingly busy period with shows mostly full to capacity.

A major current topic of interest is the proposal by Chris Phillips, an astronomy educator who is currently working at the Imiloa Planetarium in Hawaii, for the establishment of a planetarium in Gaza. Chris’ Muslim background and great interest in astronomy education led him to contact the IPS a few months ago, and I have been in email and telephone contact with Chris to learn more about his proposals.

As with so many projects, a major problem is funding. It’s not just finding benefactors to provide the funds, but it is also a matter of organising the fundraising on a firm and well-organised basis.

To date, Chris has done some excellent work in attempting to gain financial support, although progress in recent months has been rather slower than hoped. Chris points out—and I agree—that a portable dome is a wonderful teaching device and offers the opportunity to bring astronomy education to underprivileged areas. Apparently, some potential sources of funding have aimed their sights somewhat higher, and have felt that a target audience could be the tourist market.

By the time you read this, however, I am sure that Chris and I, together with other members of the International Relations Committee and the IPS Council, will have discussed this at much greater length and resolved some of these issues. I love the whole idea and the IPS Council has indeed expressed interest in the proceedings.

Moving on to a different part of the world, many of you will be aware of my great interest in astronomy education in Eastern Europe. To this end, I have been in touch, on behalf of the International Relations Committee (Continues on page 64)
Sometimes, when it comes to planetarium systems, it’s best to be single-minded!

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6th European Meeting of Small and Portable Planetaria

Due to the fantastic organization of Tomasz Kisiel and Stefan Janta, this conference at the Silesian Planetarium in Poland was a huge success. The Silesian Planetarium and Astronomical Observatory is the largest and oldest planetarium in Poland. It was founded on 4 December 1955 to commemorate the great astronomer Nicolaus Copernicus. The planetarium can seat 400 people under its 23-m dome. However, some of the seats were removed to accommodate two inflatable domes and a small half dome.

Forty-five participants from 8 countries were delighted with the smooth-running program of this conference and the opportunity to interact and share with colleagues. There were even some student observers during the opening and morning sessions on the first day. It was a pleasure to talk with these bright high school students and feel their enthusiasm.

After the conference opening I made a presentation about IPS and the benefits of membership. This information was well received and it was very gratifying to hear many attendees express a desire to join our ranks.

The presented papers included information about the activities of various planetariums as well as hardware and software demonstrations. There were workshops on techniques for teaching basic astronomy and nighttime astronomical observations.

The planetarium is located in the beautiful Silesian Central Park, on the boundary between the Katowice and Chorzów, and the restaurant where we had our meals was just a short walk through the park. The food was extremely good and beautifully presented. Our comfortable hotel was also located in the park. It was a 20-minute brisk walk from the planetarium...sometimes that was a challenge!

All in all, it was an excellent meeting. Our post conference tour was to a coal mine where we learned that it was not at all fun being a miner there! It was difficult work under dangerous conditions. Our guide was great and very talkative (in Polish) so Tomasz was challenged to keep up the translation for the English-speaking group! We learned some amazing facts about the mining process and were amazed at the transition that took place over the years, from using only man power, then horses, and finally machines to assist the miners.

Tomasz has collected photos and papers from the conference and is publishing proceedings that will be distributed to all participants. The Polish planetarium directors are already planning for another regional meeting in the near future!

My husband and I thoroughly enjoyed our time in Poland. The awesome meeting, the joyful people, the delicious and beautiful food and the amazing site seeing were all exceptional. We learned a great deal about the history of Poland and the tenacity and creativity of its people. I hope we can return there some day!

Ilpo Kuusela enjoyed this conference so much that he has confirmed that he and Arto Oksanen of the Kallio Planetaario (www.kallioplanetaario.fi) in Finland will host the 7th European Meeting for Small and Portable Planetaria. This will be another very unique experience! Participants will enjoy visiting this planetarium that is located in a cave and they may even be privileged to enjoy the planetarium’s two saunas, Big Bear and Little Bear! Ilpo and Arto are deciding on the conference date as I write this column.

Contact information: Tomasz Kisiel at t.kisiel@ajd.czest.pl; Stefan Janta at Stefan@planetarium.chorzow.net.pl; and Ilpo Kuusela at ilpo.kussela@kallioplanetaario.fi.

Brightening the projector

Frequently the teachers who visited my planetarium said, “Your projector does not seem as bright as it was last year.” There could be two reasons for this:

The teacher’s eyes are a year older and take a longer time dark-adapting. Sometimes they are shocked that at the end of the lesson the stars seem brighter! or

The projector contacts could have oxidized.

Long ago, when the Giant STARLAB dome became available, I heard that the company adjusted their standard projector to make it bright enough for the larger dome. I wanted my projector to be brighter, too, so those old-

(Left) Susan Button and Tomasz Kisiel, conference host and organizer, pose in the Silesian Planetarium. Photo by Tom Button. (Right) Stefan Janta, the other gracious conference host and organizer. Photo by Susan Button
er teachers would not complain any more! So I asked for directions about how I could make the adjustment myself.

Below are the instructions LTI was happy to share with me. They did warn that it might shorten the life of my projector bulb, but I did not notice that happening. I did not position the traveler at its most extreme position because I only wanted it a little bit brighter.

Voltage increase (1/4 to 13 volt)
• Unplug the STARLAB projector.
• Unscrew the corner screws on the projector case bottom.
• Turn the projector back to an upright position, lift up the white cover on the projector base and slide it back so you can see inside the base.
• Look for an adjustable register (1½ inches long) in the center front of the projector base.
• Look for a traveler on the register.
• Mark where the traveler is positioned with masking tape as a reference.
• Loosen the traveler contact screw.
• Move the traveler closer to the wire (slide toward wire to increase voltage) tighten the traveler contact screw.
• By the way, the contact could have oxidized and just moving it may also make the lamp brighter.
• Screw the projector cover back on, plug it in and test the brightness.

Another STARLAB hint: Another common problem is that sometimes the side lamp bulbs do not light because the contact has been compromised. Take the bulb out and clean the socket. Then put silicone grease on the tips of the projector side lamp bulbs to help them make contact.

New portable system
A new system called Digitarium Delta was recently announced. The Delta is a high resolution, low cost system; it projects a 1080 pixel diameter circle, and it is recommended for domes up to 7m/23 ft in diameter.

I have seen the Delta sky and it is really quite nice; it has many of the features of higher cost systems.

More information is here: digitaliseducation.com/products-digitarium_delta.html

Donated planetariums
I had heard a rumor about some donated planetariums in Africa and I wrote Patricia Reiff (reiff@rice.edu) to find out the story. She replied:

“Yes, a combination of Rice University, the Houston Museum of Natural Science and e-Planetarium (www.discoverydome.com) donated mirror planetariums to Ethiopia (the National Museum in Addis Ababa, November 2007) and to Zambia (to the Physics Department of the University of Zambia, June 2009).

"Both were donated as part of the ‘International Heliophysical Year (IHY)-Africa’ series of meetings sponsored by the USA National Science Foundation and NASA. We held a “GIFT” (Geophysics Information for Teachers) workshop at each conference and gave demos to high school students and teachers. Software and a selection of fulldome shows were also donated.

“The donation to Ethiopia was in partial thanks for loaning to Houston Museum of Natural Science (HMNS) the famous fossil ‘Lucy.’ HMNS created a show Lucy’s Cradle about the famous fossil and how global climate change has influenced human evolution.

“The donation to Zambia was as part of the IHY-Africa conference held this summer in Livingstone. Again we donated a full system plus shows.

“We are heading to Morocco this November so another African digital theater may be coming soon! (Plus we have sold a system in South Africa). For a map of our installations go to www.tinyurl.com/disccdome.

“Discovery Dome will top 100 installations around the world by the end of this year. Given that the initial NASA grant paid for only 6, that is an amazing outreach expansion. And a number of our customers have purchased additional systems, so that is also very gratifying."

Congratulations to all the fine work being done by the entire Discovery Dome team and for their efforts in promoting science education.

It seems that the developments of many inexpensive digital systems for portables is revolutionizing and expanding our efforts all over the globe!

I am so proud
Two portable planetariums on the White House lawn! You can read more about this in an article starting on page 20 in this issue of the Planetarian. This is a very exciting story!

Signing off
It seems like there is more news here about the digital systems, but there are still several thousand analog systems out there with planetarians using them very effectively to excite and educate students.

You all have news to share about your programs whatever planetarium you use; please write and tell me about what is going on in your part of the world. Your stories are inspirational!
INTRODUCING A COMPELLING NEW PLANETARIUM SHOW FROM THE ISLAND OF HAWAI‘I

With unique access to their facilities and in cooperation with the PIs, this first in a planetarium series for general audiences showcases the latest discoveries from three major international telescopes. Voyage into Subaru, Gemini, and Canada-France-Hawai‘i observatories to explore exoplanet TrES-1, real-time observations of the galaxy SN2008D, and the One Square Degree Survey. Featuring stunning time-lapse footage and astro simulations rendered in DigitalSky 2. Produced by Sky-Skan for ‘Imiloa Astronomy Center of Hawai‘i.

Available exclusively from Sky-Skan in both 3D stereo and standard 2D mono fulldome formats.
Contact Sky-Skan distribution at +1 603-880-8500 or e-mail sales@skyskan.com. Visit SkySkan.com/shows
tions Committee, with Dimitrie Olenici, who runs the planetarium in Suceava, Romania. Dimitrie has been a great help in providing information on nine planetariums in his country, and this communication with him is going hand in hand with the great work that is done by Publications Chair and former IPS President Dale Smith in relation to the IPS directory of the world’s planetariums.

The first public planetarium in Romania was established in Constanta, a major city on Romania’s Black Sea Coast, in 1969. Following this, several more were established, the largest being in Suceava in the north, in 1982. Suceava makes use of a Zeiss ZKP2 projector; indeed, the majority of planetariums in Romania have Zeiss projectors, and these include several ZKP1 projectors.

The first digital planetarium in Romania—an RSA Cosmos system—was established in 2008, in Pitesti. Pitesti is a town about 100 km north of Romania’s capital city, Bucharest.

Bucharest itself has a planetarium, but it is dedicated to education in the Faculty of Mathematics at Bucharest University, and my understanding is that it is not open to the public. Dimitrie’s enthusiasm for astronomy education is wonderful; in addition to the main planetarium in Suceava, he also runs a small planetarium with a Goto EX3 projector. I look forward to visiting several of Romania’s planetariums on my next visit to that country!

To Southeast Asia now, and I have recently had a report from our colleague Salin Weerabutra, at the National Science Centre for Education in Bangkok, that all three planetariums in Thailand—in Bangkok, Rangsit and Ayutthaya—are operating well. The Bangkok Planetarium celebrated its 45th anniversary in August 2009, and is still using its original Zeiss Mk IV projector. It is hoped that funds will be available for a new planetarium there in the next few years, and I wish Salin all the very best in hoping that this turns into a reality.

In addition to the three planetariums in operation, there is one under construction at the Roi-Et science centre in the north east of the country. It will have a 15 m dome and 120 seats, and is expected to open in 2010.

The International Relations Committee is dealing with several other issues, including the possibility of some translations being organised for IPS 2010. I hope to have more news about this and other topics.

Meanwhile, it’s back to the dome for me, to run that great programme Dawn of the Space Age and to show off the delights of the springtime night sky with our Zeiss ZKP3 projector. Best wishes to everyone for the solstice, the Christmas period, the New Year, and for whatever other celebrations are taking place in your country!

(Office of the President, continued from page 43)

(Earth, continued from page 12)


and legs. They could steer them around a table-top obstacle course by pulling one under the table and having the slave magnet follow.

What they are learning is how magnetism passes through objects, and by the simple method of having an old food or soft drink can, they can learn about materials too.

Just like our digital planetarium, the limitations are in your head. By asking the right questions they can learn about these things by stealth; they don’t even realise what is happening.

At the top of my list for the event was knowing that I had earned my keep. I hope that maybe I planted the seeds that will germinate into a quest for an engineering solution to a problem that does not even exist today, or sparked a new train of thought that will enable us to do something spectacular years after I am gone. It’s a bit like planting acorns, the outcome is assured, barring fire and disease, and the end product is truly impressive. Outreach rules: KO!

By the time that you read this, depending on global mail delivery, the festive season and New Year will either be upon us or will have happened, so I wish you all a great 2010, and look forward to seeing you all in Alexandria for the IPS conference.

I wish you clear and frosty nights.☆
As many “specialty” shows as we have in the planetarium field focusing on a specific astronomy topic or development, we all almost certainly have in our arsenal the tried-and-true general introduction and overview of astronomy show. You know, the one that covers topics from the earliest history of astronomy to its contemporary frontiers and everything in between. Such shows are invaluable for the interested public and useful for introductory astronomy courses as a jumping-off point. It’s such a show that the Barcelona-based Antares Fulldome aims to create with their newest offering, Astronomy: 3000 Years of Stargazing.

As an overview of the field, Astronomy: 3000 Years of Stargazing is certainly comprehensive. The show tells the general story of astronomy with the help of a cartoon Einstein and covers (in roughly chronological order) seasonal changes in the sun’s path across the sky, ancient observatories, constellations and the diurnal motion of the sky, planets, epicycles, the geocentric cosmology, the obligatory founding fathers of modern astronomy (Copernicus, Galileo, Kepler, and Newton) and their contributions, telescope design, spectroscopy, the advent of photography, relativity, the expanding universe, and non-optical astronomy.

The show ends with a discussion of some modern observatories as well as plans for future telescopes. “Einstein” rounds out the conclusion with a brief discussion on the nature of science and the differences between astronomy and astrology. As I said, comprehensive indeed.

With such a wide range of topics to touch on and limited time (though a length of 34 minutes makes this show longer than many), the narrative, of course, does not go into extended detail on any one topic. This is to be expected, and the various items touched upon are given what clarity and context they can in such a wide survey.

The fulldome visualizations complement this nicely, with especially effective models being presented in the discussion of the geocentric cosmology, epicycles, and Copernicus’ innovation. There’s also a wonderful model of Herschel’s giant reflector during the discussion of the development of telescopes and the discovery of Uranus. On the whole, the visuals serve to support the narrative well and forgo the flair that often simply distracts.

In summary, despite the above-mentioned quibbles, this show is a comprehensive introduction to astronomy from ancient to modern times. The visualizations generally are compelling and well-done, with a few especially nice illustrations. I would recommend it for anyone who’s interested in a new general-survey astronomy show that puts the emphasis more on the content than the visual bells and whistles.

My primary difficulty with the show was the (perhaps inevitable) standard generalizations of the relationship between science and religion through the years. The Middle Ages are represented as a period of “stagnation” for science due to its repression and oppression by the Church. Although the show mentions the important contributions of Islamic and Chinese cultures to the history of astronomy, it neglects the fact that modern research has generally debunked the traditional view of the Church as a monolithic body actively resisting scientific change.

One example of a misperception promulgated by this show is that circular planetarium orbits were imposed for “religious reasons.” Though this may have eventually become the case, circular orbits had their origin in Aristotelian concepts of physical motion quite independent of Christian theology.

Finally, there were a few outright errors in the second half of the show. In a long discussion on the various objects non-optical astronomy has explored, there was a comment regarding the cosmic microwave background radiation which stated that this implied we could “hear the sounds of the Big Bang.” A comment on the infrared observations of the center of our galaxy states that these have made it possible to see the black hole at the center of our universe. However, both of these mistakes are in the narration alone (and are perhaps artifacts of translational errors) and can easily be rectified.

Whenever I get to the point in my astronomy class where I’m lecturing on the solar system, there’s always the danger of falling into the role of what I call the “interplanetary tour-guide,” introducing each planet and listing its relevant statistics without a compelling narrative to pull it all together. It can get kind of boring. There’s a very similar danger in a show about the solar system. Even with...
THE POWERHOUSES OF THE UNIVERSE

STARS

NARRATED BY MARK HAMILL
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To the solar system and beyond! Finish up your International Year of Astronomy with some reader's picks for your library.

Many thanks to our reviewers: Bruce Dietrich and Francine Jackson.

Facts and Speculations in Cosmology
Reviewed by Bruce L. Dietrich, Wyomissing, Pennsylvania.

Facts and Speculations in Cosmology assesses the Big Bang for general readers in “math-lite.” This is a well-organized, competently-written account of several creation stories from the past into the present. As all myths, these contain elements of both factual observation and reflections of human nature. We are reminded that periodically our basic scientific notions are challenged by disconfirming observations. (Today, these pesky anomalies lurk about eight places right of the decimal point, poised there to clear away any intellectual hurdles.)

The book’s preface tosses a gauntlet with this quote from Lev Landau: “Cosmologists are often wrong, but never in doubt.” Throughout the manuscript we are reminded that standard model supporters just don’t have sufficient data to support Big Bang. They seem to add assumption upon assumption to save their model; they also gloss over alternate meanings of red shifts and specific observational anomalies. Indeed, the days of epicyclic meddling appear to still be with us.

Not to fear, Drs. Narlikar and Burbidge introduce us to quasi-steady-state cosmology. This is well developed and very well explained. The fact that Cambridge University Press publishes books by well respected astrophysicists who question the standard model should obviate collegial carping. Certainly we don’t yet have a complete understanding of much, let alone the universe. If you want an easily read disputation of the issues, this book is one source.

Hopefully the Plank mission, which is measuring the Cosmic Microwave Background over a broad range of far infrared wavelengths alongside the Herschel Observatory, will soon provide additional data. While the debate will likely simmer on, some answers about the dynamics of universal inflation and ionization are soon due in from L2.

The Compact NASA Atlas of the Solar System
Reviewed by Francine Jackson, University of Rhode Island Planetarium, Providence, Rhode Island.

There’s something to be said about a book labeled “compact” that weighs more than an end table. This book is truly a compendium of just about everything you’d want to know about our solar neighborhood; unfortunately, it’s already a bit out of date.

One of the problems of creating something like this is almost as soon as you’ve got your information together, there’s bound to be errors in it—not because of the actions of the authors, but because astronomy is one of the fastest changing disciplines. Before the pages have cooled off, a new discovery is made, rendering something in the book obsolete. For example, the copyright date of 2001 means that Saturn’s visit by the Cassini spacecraft and subsequent Huygens drop-off hadn’t arrived by press time. All of the latest images, although beautiful, are from the Voyager flybys. Also, poor Saturn is only sporting 30 moons, many fewer than its latest number of—now, what was that number again? 60? 62? Or, is it down to 44? You see the problem.

What really makes this book, though, are the full-page and sometimes double-page images and air brushes of many of the satellites in our system. For instance, a double page of Tethys has three air brushings, rotated 120 degrees apart. The more significant surface features are labeled and the images are all but 3-dimensional. Triton’s sketch fairly leaps out of the page at you. Even the Earth-moon system is featured, including a geologic map of Earth showing the varied ages of its surface.

The text, although informative, is rather dry. It’s almost as if the authors tried to put down everything they knew about each individual destination, which is fine, but it doesn’t make this a cover-to-cover readable book.

What it does have, though, is a terrific appendix of every planetary spacecraft from Mariner 10 to Stardust, including the ones that didn’t make it, such as Thor-Able I to the moon, and 1992’s Mars Observer, whose billion-dollar price tag led to the NASA “faster, better, cheaper” philosophy for many years.

(Continues on next page)
the best special effects, after a while it can seem to be little more than a guided tour. A potential way around this is to find an underlying theme and use it to introduce the planets. For example, in my own class this semester I decided I’d focus on the topic of where liquid water might exist in the solar system. The led easily into a discussion of Mars, the Jovian moons, and Titan.

This second show from Antares Fulldome takes a similar tact: it uses the accretion theory of the formation of the planets in the solar system to introduce a tour of some of the solar system’s most spectacular craters.

The Birth of the Solar System begins with a short discussion of the formation of sun and the solar system. Instead of simply introducing the theory and moving on, however, the show takes the excellent next step of discussing the repercussions of this theory: that if the planets accreted out of the debris surrounding the young sun, the evidence of these collisions must still be in existence. Impact craters thus provide evidence of collisions dating back thousands of millions of years and support our current understanding of the solar system’s birth.

The show’s exploration of this evidence leads to discussion of the crater Tycho on the moon and a short segment on the moon’s formation, discussion and images of bodies including Callisto, Mimas, and Phobos, and finally an overview of the collision of the comet Shoemaker-Levy 9 with Jupiter.

The show concludes with exploring a few impact craters on Earth and discussing the reasons there are not as many craters visible here as there are throughout the solar system.

Although this certainly does not represent a comprehensive overview of the entire solar system, it’s a great stepping-off point for further discussion and more engaging than many of the overviews I’ve seen.

The visuals for this show included good graphics of the surfaces of various solar system objects; especially nice were the images of craters on Phobos. The music for this show also stood out.

The only major flaw I noticed was the ubiquitous “picket fence” of asteroids littering the space between the orbits of Mars and Jupiter on the final zoom-out of the solar system. I’m all for stamping out this misrepresentation whenever it rears its head, but it was especially noticeable since the show had just explained how the early and near-constant bombardment involved in the formation of the planets had created a much safer solar system by sweeping it clear of the majority of debris. Thus events like the impact of Shoemaker-Levy 9 are not everyday happenings. To say that and then show the old, familiar, inaccurate asteroid belt is unfortunate.

Sébastien Balibar is director of Research at the Laboratory of Statistical Physics of the Ecole Normale Supérieure, Paris. He received his Ph. D in 1976 and has carried out extensive research in low-temperature and condensed-matter physics. Dr. Balibar was an invited professor at Konstanz University, Kyoto University, and Harvard University, where he was a recipient of the Loeb Lectureship. He was elected a fellow of the American Physical Society and shared the Fritz London Memorial Prize in 2005.

His book calls out to those random thinkers who often avoid science books because they are sequentially developed. In one chapter alone Balibar takes us on a friendly bicycle ride from the Chevreuse Valley through the Rambouillet Forest. The sounds of the wind in our ears effectively lead us to understand slip streams, the energy efficient swimming behavior of fishes, the laminar structure of puff pasty, very long term chaotic planetary behavior, and quite naturally, the variability of global economics!

In addition to a fine index and extensive end notes, the remaining 92% of this remarkable mélange is devoted to Crystals and Glasses, Black Night, The Power of Words, Is My Table Quantum?, the Sun, My Cousin the Leek, Radioactivity, Einstein, From Pianos to the Sun, and MUCH ELSE. There is a splendid extra section of “What I don’t know,” in which the author explains why he prefers the uncertainties of research to the certainties of taught science. We heartily recommend this colorful mosaic of modern physics to anyone who could use a full dose of avidity and intellectual vigor.
The vision of the International Year of Astronomy 2009 is to help the citizens of the world rediscover their place in the Universe through the day- and night time sky, and thereby engage a personal sense of wonder and discovery.

All humans should realize the impact of astronomy and basic sciences on our daily lives, and understand better how scientific knowledge can contribute to a more equitable and peaceful society.

The IYA2009 represents an excellent opportunity for the planetarium community to not only further their activities, but reach new audiences. The IYA2009 is constantly growing in the number of people and organisations involved, but also in the number of resources it makes available to its partners. The IYA2009 trailer is for instance available in 43 languages, as well as in fulldome format. This is a unique resource for planetariums and science centres.
This issue presented a novelty: the first advertising to appear in The Planetarian in over a decade. The first ad, appropriately, was from Zeiss, introducing the M1015 projector.

The first article reprinted Von Del Chamberlin’s Armand Spitz Memorial Lecture at the 1984 IPS Conference in Monterrey de Mexico, “Focusing from High Places.” He drew a parallel between the mountains surrounding Monterrey and the “high place” Newton, Spitz and others worked in. Nature is worth studying, Von Del said, “because it is beautiful. If nature were not beautiful, it would not be worth knowing, and if nature were not worth knowing, life would not be worth living...Models which led to modern science, and those which did not, are interpretations...Interpretations are what people come to planetariums for.”

Dennis Mammana (Tucson, Arizona) described a planetarium show on the Space Shuttle that used footage from on-board cameras in early flights (film, of course—digital was just a dream). The cameras faced unique problems, from lubricants reacting to zero g to facing up to 10 g pressures during launch. Extreme temperatures and vacuum were added problems. To control costs, there had been no real time feedback on such trivia as what the cameras were seeing, whether they were running, and how much film had been exposed, yet 80% of the film turned out to be usable.

Michael Ryan (Lake County Schools Planetarium, Florida) addressed the problem of what can be done to assist planetariums threatened with closure, a hardy perennial. He first summarized the various categories of planetarium control: museum, university, school system, etc. Each is handled differently. Regardless, closure is usually for financial reasons, without any consideration of educational, cultural or entertainment values. The most vulnerable are school system planetariums, which generate no revenue at all, and those which operate at a deficit.

Ryan proposed that public pressure can be effective. This can involve parents and others at an annual open house or special shows. Sympathetic teachers, professionals, friends, students, relatives, community leaders, and planetariums in the area can all lend support. Letters should be sent to individual school board members. Children’s drawings and other classroom activities based on planetarium visits can be made into a calendar, book, etc.

For planetariums expected to generate revenue, free publicity for programs can be found in newspapers, radio, TV (and today, cable). Use volunteers. Make sure programs appeal to the public, not just planetarium personnel! Concerts and laser shows can generate income. In a last step, seek a consultant.

A joint effort reported

Jack Dunn reported on a joint effort between IPS and Evans & Sutherland. This was to produce a “videotape of significant astronomical topics using the E&S Digistar.” It included a Ptolemaic orrery, Copernican orrery, orbits of Neptune and Pluto in three dimensions, a trip to Aldebaran, a walk around Orion, and the proper motion of stars.

Jeanne Bishop gave her last report as president. Walt Tenschert was retiring as treasurer but continuing as membership chair. Members were to receive a book of George Reed’s “Cosmic Cartoons.” IPS was about to send out “a very long survey” (italics in the original) for a new directory, conference planning, topics for future special reports, and for academic doing research.

John Mosley was preparing an index to articles appearing in The Planetarian. Planning for the 1986 IPS conference in Tucson was advancing. People were not responding to the requests for material to be included in the proposed NASA video on planetariums (it died). The current IPS Directory did not make a proper distinction between the two Zeiss firms (Oberkochen in West Germany and Jena in East Germany). This problem disappeared with the fall of the German Wall a few years later.

John Wharton’s Gibbous Gazette opened with a report on the status of the Fiske Planetarium (University of Colorado). Competition to become one of the teachers to fly aboard the Space Shuttle was announced. The McLaughlin Planetarium (Toronto) had given a show on astronomical history (Stars Over China), and then surveyed audience preferences.

History was the bottom choice, followed in unpopularity by constellations and star lore. Most popular were life in space and recent discoveries, but of those who saw the history program 80% rated it good or excellent. Kirkpatrick Planetarium (Oklahoma City) loaned their Apollo Portable for use in a made-for-TV movie, Survivors (no one ever wanted to use my Apollo Portable in a movie!).

The ASP inaugurated its newsletter for teachers. The Griffith’s annual context for popular art in astronomy was announced. Various items relating to the impending apparition of Comet Halley were for sale. Numerous personnel shifts were noted. The column ended with mock awards (“Most convincing special effect—a campfire projector emitting smoke and flames.”)

Regional Roundup, for the last time under Jack Dunn, listed events and activities from Mexico, GPPA, MAPS, GLPA, PPA, SWAP, and SEPA.

Mark Sonntag did the column on education, here carrying an article from Kansas. For various reasons, science education was being cut from elementary schools. The article described “experimenting with a way to keep science in the curriculum by integrating it with reading instruction.” The reading unit reported was based on a lesson on the moon adapted to grades 1 through 3. A planetarium lesson was developed to supplement classroom instruction.

Using Holst’s music

Gerry Mallon wrote on lessons he developed with a music teacher, using Holst’s music in an integrated unit on the planets. This got fairly technical, combining astronomical facts on individual planets with analysis of what instruments were playing and why they were chosen.

Eric Melenbrink’s Creative Corner presented a detector for lamp failure (before the show went on), designed by Scott Sayre of Bowling Green University (Ohio).

James Brown’s What’s New reported the Zeiss M1015 projector, a poster of an early spacewalk from the shuttle, the Cambridge Deep Sky Album, and a planetarium program for the hearing impaired (not the one on John Goodricke that I did about that time).

Jane Geohagen ended the issue with some humorous alternate names for a planetarium, such as the Soularium that teaches break dancing under the stars, or the astronautarium, a facility specializing in simulated space sickness.
2010
January. 5th Conference and workshop on Planetariums, Parque de las Ciencias, Granada, Spain.
28 February. Deadline for IPS Eugenides Foundation Script contest.
15-19, March. Conference “Communicating Astronomy with the Public 2010,” Cape Town, South Africa, www.communicatingastronomy.org/cap2010/index.html121, information@eso.org, capjournal@eso.org
31 March. Deadline for application for scholarship funds (IPS support Alexandria Conference attendance by individuals).
17-18 April. Italian Association of Planetaria (PLANIT), XXV National Conference, Perugia, Italy, www.planetaritaliani.it. Contact: osservatorio@serafinozani.it
5-7 May. Canadian Association of Science Centres Annual Conference, Montreal, Quebec, Canada, www.canadianscience-centres.ca/main.htm
6-8 May. Annual Conference of the British Association of Planetaria (BAP), Intech Planetarium, Winchester, Great Britain.
29-31 May. German Planetarium Association Annual Conference, Bochum, Germany.
3-5 June. ECSITE Conference (European Network of Science Centres and Museums), DASA, Dortmund, Germany. Grant opportunity for attending Pre Conference and main Conference. www.ecsite.net
8-12 June. Novice Blender Workshop at Ott Planetarium, Ogden, Utah, USA. June 15-19, 2010 - Advanced Blender Workshop. Registration is required. See weber.edu/planetarium/training for more information.
8-12 June. Southeastern Planetarium Association (SEPA), Annual Conference, Kingsport, Tennessee, USA.

11 July, total solar eclipse
2-5 October. Association of Science-Technology Centers (ASTC) Annual Conference, Bishop Museum, Honolulu, Hawaii, USA. www.astc.org

2011
May. Association of French Speaking Planetariums, Yearly Meeting, Saint-Etienne, France.
4-8 September. 6th Science Centre World Congress, Cape Town, South Africa. www.astc.org
15-18 October. Association of Science-Technology Centers (ASTC) Annual Conference, Maryland Science Center, Baltimore, USA. www.astc.org

2012
22-26 July, 21st International Planetarium Society Conference, Irene W. Pennington Planetarium, Louisiana Art & Science Museum, Baton Rouge, Louisiana, USA, jelvert@lasm.org

Yearly Deadlines for “A Week in Italy”
31 August. Deadline for “A week in Italy for a French-speaking Planetarium Operator.”
15 September 2009. “A week in Italy for an American Planetarium Operator”.

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 is included in the International News column.

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
Ian McLennan shouted in horror, “NO!”

The chariot. so he stepped into the back.

wanted to know what it felt like to stand in Phaeton’s dare, the story went, "Phaeton just harnessing the horses and placing the sun in the chariot.

When the narrator reached the section about their dare that he prove his parentage by driving the sun chariot, and an increasingly excited narrative about Phaeton's difficulty in harnessing the horses and placing the sun in the chariot.

One afternoon there was a crowd of young-day-campers in the audience, and from the level of silence, they were paying close attention. When the narrator reached the section about Phaeton’s dare, the story went, “Phaeton just wanted to know what it felt like to stand in the chariot, so he stepped into the back.”

From the silent audience, one small voice shouted in horror, “NO!”

The magical pointer ...

Ken Brandt offered a “Harry Potter” event for his public audiences, to coincide with the Jupiter/Neptune conjunction in July. Some 250 observers earned an OWL (Ordinary Wizarding Levels) certificate, complete with the signature of Ken Brandt, Astronomer-in-Residence, Ministry of Magic.

Ken said his favorite part of the evening was “lining up so Polaris was right over the entrance archway, and commanding my green laser pointer to ‘engage’ with “LUMOS!” in my most obnoxious loud voice. That’s not a wand; that’s a WAND!!!”

... and the magical Dexter

Dave Hostetter shares a new Dexter LeDoux story. (Dexter LeDoux is an incredibly talented technician at Dave's planetarium in Lafayette, Louisiana.)

Dave reports: “I have actually seen a broken projector start working when he simply touched it. I have seen broken projectors start working when he stood beside them. I have even seen a broken projector start working when he walked into the projection booth. That type of stuff doesn’t even raise my eyebrows anymore.

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Congratulations to three well-known names in the planetarium field.

First up: Bill Peters, IPS president in 1981-82, and Ian McLennan, consultant extraordinary, who were honored by the Canadian Association of Science Centres in June with their annual CASCADEx Awards for Outstanding Career Achievement.

Peters was CEO of TELUS World of Science in Calgary until his retirement in late 2008, when he became the chief project officer of development of the New Science Centre 2011 Project.

McLennan began his career as a science centre executive, and in the nearly 50 years since then has developed an international reputation as an “extraordinarily well-informed and effective consultant” in the development and operations of science centre, museum and planetarium experiences.

And congratulations to Tom Hamilton, who has had an asteroid named in his honor. The press release said, “Asteroid 4897, discovered by Eleanor F. Helin while working at the Palomar Observatory in California, has been officially renamed “Tomhamilton” for astronomer Thomas Wm. Hamilton of Grymes Hill, New York, according to Brian Marsden, director emeritus of the IAU Minor Planet Center at Harvard University. Hamilton worked for several years on the Apollo Project, mainly determining radar and fuel requirements for the mission.”

Tom’s contributions to the planetarium field are many and varied—including keeping us grounded with the Planetarian’s 25 Years Ago column—and we are fortunate to have him as a colleague.

Tonight I was the last one out of the building and could not get the security system to work. I tried everything I have done in the past to get it working, but with no luck. I finally called Dex at home for advice. When I returned to the security system to try his suggestion, it was working perfectly.

“I’m pretty sure that fixing a museum security system from across town over the telephone is a new ‘long distance Dexter no-hands repair’ record!”

Next: Februaryoid?

Steve Russo shares this message, forwarded from the Vermont Astronomy Group:

“The International Astronomical Union determined this week by a close vote that February is too short to be considered a true month. It has, however, been granted the newly created status of “dwarf month.” It shares this dubious distinction with several other calendar time spans, including Labor Day Weekend, Christmas Vacation, and the Time Between When You Were Supposed to Get Your Oil Changed and When You Actually Did.

“It only seems fair,” said IAU President Ron Eckers. ‘February reaches peak size of 29 days, averaging only 28 days for 75 percent of the time. Recent research has shown that other periods, such as the Time Between When You Were Supposed to Get Your Oil Changed and When You Actually Did, often exceed this meager time frame. In fact, this erratic behavior only strengthens our case that February does not belong in the same classification as the eleven ‘true’ months.”

Eckers also warned that the crop of 30-day “so-called” months should be careful to maintain their number of days. “They’re already cutting it pretty close in my book.”
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