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On the Cover: A solar system is forming in the lobby of the main entrance of the Eugenides Foundation in Athens, Greece. Called Genesis, it was created by acclaimed artist Kostas Vartos. See more in International News, page 48. Photo by Yannis Panousis, the Eugenides Foundation.
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The Editor reserves the right to edit any manuscript to suit this publication’s needs.
Thoughts on High Pressure Synthesis

Here’s a test for you. Pick a verb from the following list:

• ignite  •   excite
• foster  •   kindle
• arouse  •   provoke
• awaken  •   stimulate

Use your verb to fill in the blank below:
You cannot teach passion. You can only ___ passion in a student.

Now realize that whatever verb you pick, you can’t quantify its results.

How do you assign a numerical value to something you can’t see at the time because the student doesn’t let you know how happy she is that you told her “great job” for an answer to a difficult question? Later, however, she decides to major in engineering. Are you responsible? Maybe, maybe not, but you did ___ (pick your verb) it.

You can’t graph the effect of a high five on the fifth grader who, as a result of the recognition and feeling good about his experience, picks up a book of science fiction and becomes hooked on the possibility of travel to another world. So passionate, in fact, that he invents faster than light travel 30 years from now.

Planetarians—in fact, anyone passionate about their careers—know that there’s a moment when something seen, heard, or experienced ___ (pick your verb) a passion.

What we don’t know is how to quantify those verbs. Not being able to do so is affecting our lives, our careers, and our future—possibly everyone’s future.

I know this sounds grand, but there such an enormous push in education today to produce results that can be numerically analyzed that we’ve forgotten our mission: to educate students. No education=no progress=no future.

Pressure from above is increasing the importance on quantifying results. Why? So that people who have no clue about how education is achieved can point to a bar graph or pie chart, examine the numbers, and say “we have to find ways to improve performance and cut costs.”

My guess is the people demanding results have never been in a planetarium or been inspired by the stars. They’re the people you heard in the hall five years ago saying “why do I have to learn ___ ? I’m a ___ major! I’ll never need it.”

Laugh, agree, but also realize that it’s an accepted phrase now on college campuses, including the public traditional liberal arts campus. We’re watching core courses disappear and the onus for teaching the “intensive” reading/understanding, writing, and arithmetic are being squeezed in to a “while you’re at it, include and grade on these areas in your major courses” mandate.

Another thing that I’ve noticed is no matter how much money you save or how good your results are, they’re never good enough. Nowadays it’s not enough that a well-run business simply make a consistent (albeit unchanging) profit. Business plans—now unfortunately being adopted by universities—require projections that it will increase profits; a year that repeats last year’s healthy profit is not a success because it did not increase profit.

That’s simplification, but you get my point. We’re psyching ourselves into a no-win situation in which we’re never good enough under “business plans” that cannot be applied to education.

Squeezing from below are all the pressures on schools: from state and federal governments, from communities and families that no longer function as that vital link in the education process, and from—you got it—the need to quantify results.

No Child Left Behind, national standards, state standards, school “report cards” published in the local papers or online have diluted the effectiveness of the school’s primary mission: to educate.

Education requires one of those active verbs I gave you before, and a vital single point of a person interacting with another person.

Chemists call this a single point a high-pressure synthesis point, and it works for me as a metaphor. High pressure from above and below, and a crucial point where the synthesis either works or doesn’t work. In this case it’s not a new compound, but education. And it’s so very fragile.

I wish I knew what we can do to keep the synthesis points from missing each other and having the whole mess collapse in on itself.

I do know it will take passion.

While nosing about Astronef’s web site to verify a fact about their new program Galaktos: A Tour of the Milky Way, I came across and fell in love with this stell image from their show. I guess I am still a country kid at heart. I don’t think quickly enough to have pulled this off, but when Jessie’ (daughter) saw it, she wanted to know if it was “galaktos intolerant.” So sorry, Jacques, especially if the pun works only in English! Image used with permission.

“Creation of a Star” by Joe Tucciarone. There are many ways to interpret this image, but I felt that it perfectly illustrated high pressure synthesis. Used with permission.
Fidelity GO™ is our new premium solution for smaller dome theaters up to 13 meters in diameter.

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Great things really do come in small packages.
To the Editor,

I read with some consternation Steve Tidey’s review of *The Chilling Stars: A New Theory of Climate Change* by Henrik Svensmark and Nigel Calder in the December 2009 issue. The topic of climate change has been controversial politically, especially in the U.S. However what should not be controversial is scientific support for anthropogenic climate change. The scientific evidence has been accumulating for decades, and as the last Intergovernmental Panel on Climate Change reported, “warming of the climate system is unequivocal” with solid observational evidence from “increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level”[1].

Scientific debates, normally confusing enough, can appear downright baffling when politics is thrown in the mix. In such cases, I believe the best recourse for sorting out claims and counter-claims is to look at what the scientists themselves are saying. (As astronomers, we do the same with those who claim the moon landings were faked.) Caution is also warranted when studies show that few in the anti-climate change lobby have any experience or background in climate science [3, 4], and the funding of organizations skeptical of climate change often come from suspect sources [4].

Returning to the subject of the book review, Svensmark’s work is indeed intriguing, and would be important if confirmed. However his research has been the subject of considerable criticism. RealClimate.org, a collective blog commenting on the field by active climate change researchers, has critiques of Svensmark in refs. [5-7], as well as ref. [8] on the claim that ionizing radiation from cosmic rays should lead to cloud condensation nuclei. If you find blog postings unconvincing because they are not refereed, then turn to the multiple peer-reviewed papers responding to aspects of Svensmark’s research. Peter Laut has pointed out arithmetic errors in the published work showing a link between cloud cover and cosmic rays [9]. Cosmic ray correlation with cloud cover is also not seen in the observational studies of refs. [10-13], nor was a link found between cosmic rays and aerosols [14]. A careful examination of the physics of aerosol-formation-by-cosmic rays shows it to be too weak to adequately explain cloud formation [15]. The claim that Snowball Earth episodes correspond to spiral arm crossings by the sun falls apart when a more realistic Milky Way arm model is used [16].

Scientific ideas are not proven “true” by either one or a hundred papers. Scientific conclusions are by definition tentative, and should always be subject to further scrutiny. Although the weight of the evidence is against Svensmark’s hypothesis, I fully support follow-up studies, like CERN CLOUD, that can shed further light on the topic. In fact there is already an unpublished report of preliminary results from that experiment, along with the referees’ comments [17], showing a healthy scientific process at work. However given the reviewer’s remarks about the “carbon lobby” and flippant dismissal of climate models because they don’t “do clouds well,” it is not clear Tiddy is letting science lead the debate. (As for his mistrust of computer models, has he tried to understand how well they track reality? Why are clouds difficult to parameterize? How do different parameterizations affect the final model result?) The review seems to be written from the perspective of a mind made up, not one open to the actual scientific evidence. That is not a mindset that serves our planetarium audiences well.

Ka Chun Yu
Denver Museum of Nature & Science

References
Global Warming is a Well-founded and Established Scientific Fact

To the Editor,

When first reading Steve Tidey’s article in Planetarian December 2009, reviewing The Chilling Stars, I was quite upset. The book presents possible astronomic causes for changes in the global climate. But Tidey took the opportunity to push forward his own view that human activities don’t affect the climate. Denying this extremely well-documented scientific fact shows that he is either cynical or stupid, and in any case very unscientific. I almost sat down at once to write something really an-
gry, but I figured it would be better if I calmed down first.

Denying human effects on the climate puts him in accord with holocaust deniers and creationists opposing biological evolution. But he is much more dangerous than these. Unfortunately, Tidey and the likes of him get much space in media, who love to put forward different views, scientific or not. One of my friends at US National Renewable Energy Laboratory sent me a worried email just before New Year. He told me that now 40% of US citizens don’t believe in mankind causing global warming. Those 40% don’t pay attention to IPCCs scientifically based warnings, and they pick their information instead from people like Tidey and the likes of him.

I spent some time in Copenhagen during COP15 and got the chance to listen to over 100 heads of state. They all took as bases for their talks the threat of global warming and advocated strong measures to lower emissions of carbon dioxide and other greenhouse gases.

Climate researchers all over the globe completely agree that human activities are a major cause for global warming, affecting the climate and causing the ocean surface to rise. A tiny fraction of them have another opinion. It is unscientific to disregard the conclusions of thousands of scientific reports and instead build an opinion on a handful of selected papers. I am not a climatologist but I am a scientist, and I trust a vast majority of my fellow scientists when they agree. Planetariums should be devoted to science, and not advocate superstitious, religious, or other nonscientific views of the physical world.

Finally, I must write that I didn’t like the decision of Planetarian Executive Editor Sharon Shanks to publish Tidey’s article as the first one in Planetarian dealing with global warming. It is as if Planetarian first would publish an article advocating intelligent design, and only after that published articles on the scientific world view.

Lars Broman, Professor of Physics
Strömstad Academy

It is unscientific to disregard the conclusions of thousands of scientific reports and instead build an opinion on a handful of selected papers.

Call for Nominations

The IPS has announced the call for nominations for president elect, secretary and treasurer for 2011-2012. Martin George, chair of the Elections Committee, is keen to receive nominations, which can be sent to him at martin@qvmag.tas.gov.au.

Nominations will also be accepted from the floor at the IPS Conference in Alexandria in June.

Martin points out that this is an opportunity for every IPS member to have a say in how our society is run! The terms of office for secretary and treasurer are two years each, while the president elect will be president in 2013-2014 and past president in 2015-2016.

Welcome PARTYcles, the creation of Alex Cherman from the Planetário do Rio de Janeiro in Brazil. Alex generously offered to share his comics with Planetarian readers; I’m sure you’ll enjoy them as much as I do.—editor

PARTYcles

This attraction is proportional to our charges, and inversely proportional to the square of our distance.

Ouch! There goes the romance!

Hey! I feel the same way!

Don’t get me wrong, but I feel terribly attracted to you.

I’m an electron.

Hello. I’m a proton.

I’m an electron.
Making it Better:
A case study of improving a planetarium show through formative evaluation

Mike Shanahan
Director of Education, Exhibits and Planetarium
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The Bishop Museum (Honolulu, Hawaii) recently produced a planetarium show called "The Astronomy of Galileo," the first original product in six years. Our experience with show production was intensive from 1998 to 2002, when we produced and distributed three NASA-funded "Explorers" shows. These were I: The Explorers (1998), II: Explorers of Mauna Kea (2000) and III: Explorers of the International Space Station (2002). NASA funding came to an end in 2003, and production work went on hiatus.

Now that we were working on a new show, I wanted to use my experiences with the Explorers shows and see how evaluation could be used to refine the new program at each step of development. Explorers I, in particular, had done some interesting formative work, for example, in discussing topics and storyboards with potential audiences.

I had another motivation as well. As someone who has spent most of his career in general science center and museum management, I am aware of the mixed reputation that planetarium programming sometimes has among my peers. Many of my colleagues in the field like the idea of the planetarium, but don't always enjoy the planetarium experience itself.

Over the years, besides general praise for the planetarium experience, I've fielded occasional comments about planetarium programs being too long, having too much information, or being too boring. I've also fielded comments that planetarium shows sometimes seem to be written with the questionable assumption that the audience loves our topic as much as we do. I had to watch out for this trap in particular with "Astronomy of Galileo," since I had written my master's thesis on Galileo at the University of Washington in Seattle (1994).

I felt that, if I could really get audience input at every step of the show development process, I could avoid the frustration of investing a lot of time and money in a program and then realizing upon evaluation of the final product that the program doesn't really work that well for its intended public.

That led us to 2009 and the decision to do a planetarium show on Galileo as part of International Year of Astronomy.

About Watumull Planetarium
First, some general information on our planetarium. Bishop Museum's Watumull Planetarium is a 30-ft, 70-seat dome. We are a traditional dome with a GOTO GS opto-mechanical projector and Spice animation to control the standard three banks of slide projectors, a panorama, and a single inset video projector. Planetarium attendance is about 90,000 a year, a substantial subset of Bishop Museum's overall annual attendance of 350,000. Planetarium admission is first come first served, and is included in the general museum ticket price.

Starting With Basics
There were some basic assumptions about "Astronomy of Galileo" from the start:
• The final version of the program would be split 50-50 between automated segments and live segments. This has been a hallmark of Bishop Museum planetarium programs since the museum developed the first Explorers show under Ken Miller's direction in 1998.

   While I came out of the “all live all the time” tradition of planetarium programs at Pacific Science Center in Seattle, I have found the mix of live/interactive and automated segments to be particularly effective for engaging our myriad audiences here at Bishop Museum.

Author's Note: while there is not room here to provide all of the survey data discussed in this article, full results and raw data are available at the Bishop Museum planetarium website. This provides day-by-day evaluation data and also provides summaries of the evaluations on each version of the "Astronomy of Galileo" program: www.bishopmuseum/planetarium/planetarium.org

Evaluation Form: Astronomy of Galileo
Date:                                       Show Time:

Please rate the overall quality of the program:
1 (poor) 2 (fair) 3 (OK) 4 (good) 5 (great)

Rate the educational value of the program:
1 (poor) 2 (fair) 3 (OK) 4 (good) 5 (great)

Rate the entertainment value of the program:
1 (poor) 2 (fair) 3 (OK) 4 (good) 5 (great)

Is the show:
Too long Too short Just the right length

Does the show have:
Too much content Too little content Just enough content

What did you like best?

What didn't you like?
The live sections would be interactive in the “POP” (Participation-Oriented Planetarium) sense; i.e. the audience would be actively involved in making observations, predicting, etc.

While the target of the show was 35 minutes, we would use audience feedback to determine the right length of the program.

In addition to being 50-50 live vs. recorded, I wanted approximately half of the show to be spent with the night sky (as opposed to stills, video etc.).

Along those lines: while there are many fascinating aspects of the Galileo story, we would concentrate on those parts of the story that are best illustrated by a planetarium.

That being the case, we decided early on that the program would focus on the debate between the two chief world systems and “the ways in which the telescope helped Galileo show that Copernicus was right.”

The planetarium sky would then play a significant role in telling this story. Daily motion would demonstrate the fact that the sky does, in fact, seem to spin around the earth. Planetary motion would introduce the concept that it was hard to explain retrograde motion in fact, seem to spin around the earth. Planetary motion would introduce the concept that it was hard to explain retrograde motion neatly in a geocentric model.

We reassembled two key players from the Explorers Project. Ken Miller, the founding manager of the project at Bishop Museum and now a GOTO employee, agreed to donate his time as the narrator. Davo Coria, a local composer/musician who created original music for the three Explorers shows, gave me theposer/musician who created original music now a GOTO employee, agreed to donate his manager of the project at Bishop Museum and Explorers Project. Ken Miller, the founding

fascinating aspects of the Galileo story, we would concentrate on those parts of the story that are best illustrated by a planetarium.

That being the case, we decided early on that the program would focus on the debate between the two chief world systems and “the ways in which the telescope helped Galileo show that Copernicus was right.”

The planetarium sky would then play a significant role in telling this story. Daily motion would demonstrate the fact that the sky does, in fact, seem to spin around the earth. Planetary motion would introduce the concept that it was hard to explain retrograde motion neatly in a geocentric model.

We reassembled two key players from the Explorers Project. Ken Miller, the founding manager of the project at Bishop Museum and now a GOTO employee, agreed to donate his time as the narrator. Davo Coria, a local composer/musician who created original music for the three Explorers shows, gave me the rights to a range of his excellent pre-existing music. The budget was very, very lean: my time plus $3,000.

**Table 1. Comments pertaining to planetarium night sky**

<table>
<thead>
<tr>
<th>Comment</th>
<th>#:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stars</td>
<td>20</td>
</tr>
<tr>
<td>Constellations</td>
<td>18</td>
</tr>
<tr>
<td>Star motion</td>
<td>13</td>
</tr>
<tr>
<td>planet hunt activity/planet motion</td>
<td>12</td>
</tr>
<tr>
<td>Hawaiian sky</td>
<td>10</td>
</tr>
<tr>
<td>Sky tonight (i.e. specifically the current sky)</td>
<td>5</td>
</tr>
<tr>
<td>Constellation outlines</td>
<td>5</td>
</tr>
<tr>
<td>Transit from Padua to Hawaii sky</td>
<td>2</td>
</tr>
<tr>
<td>Dark sky</td>
<td>2</td>
</tr>
<tr>
<td>Meteor shower overview</td>
<td>1</td>
</tr>
<tr>
<td>Venus</td>
<td>1</td>
</tr>
<tr>
<td>Subtotal of all “planetarium night sky” comments</td>
<td>69</td>
</tr>
</tbody>
</table>

It’s notable that the mere fact that we have outlines for the constellations rates highly here; we sometimes forget how helpful those are to the public.

**About the Evaluation Format**

I developed a simple evaluation and administered it at a number of performances of *Astronomy of Galileo* from its debut on November 13 through December 31, 2009. We collected 302 evaluations from 18 performances of the show during that period.

I wanted to take the information, summarize it quickly after each show, and revise the planetarium show to address the concerns and comments raised in that day’s worth of comments.

Historically we, like so many other facilities, have sometimes had a hard time putting the data from evaluations into practice. I still have boxes of evaluations of our culture and science outreach programming from 2001 sitting in my office, unprocessed, so I committed to taking 20 minutes of my time after each show to input each audience’s data. (A lot of good work has been done recently in collecting and processing evaluations electronically. This should be a major step forward in overcoming the hurdle of compiling the data.)

**Analysis and Revision Process**

I wanted to create a show that rated highly in both educational and entertainment value, and that the audience felt was “just right” in both length and content. Given these goals, I did not attempt to assess content absorption and retention in this evaluation. That’s another project for another time.

In order to quantify the process I came up with a simple guideline: on a scale of 1 (poor) to 5 (great), I wanted to end up with a show that got at least an average 4.25 rating for overall quality from all audiences. Perhaps that’s an arbitrary target, but it was a way to get at the Sally Fieldian question: “Do they like it? Do they really like it?”

As mentioned above, it takes the time and energy to revise a program based on input from evaluations. To get past this roadblock, I did the program entirely live for the first month. By doing the show live I was able to change content on a daily basis, cut or (more rarely) expand the content of a given section, and rewrite segments to make them more concise or clearer. Content, length and flow could be quickly adjusted between one offering and the next.

When we moved to the version of the show that used recorded segments (mid-December 2009), I used GarageBand from Apple so that I could make soundtrack changes quickly and get a new version of the program turned around within a day.

Interesting enough, in these final days of the 35 mm slide, I found slide production to be easier than ever. Given the historical nature of the program, I found it easy to locate almost everything I needed, in high enough resolution, on Wiki Commons. Gamma Tech (based in Albuquerque New Mexico) provided reliable, fast service; one just uploads digital images to their web site and gets high-quality slides on a fast turnaround. If I needed new visuals to fill in dead spots in the program, it took only a few days to get them into the carousels.

**First Draft of the Program**

The show debuted in draft form on November 13. The evaluations from the first day, November 13, were a good start, despite the small sample from the show’s first audience. The overall quality rating for the program came in at...
an average of 4.00 on our scale.

During this first week I made a number of changes in the show, based on feedback from this first day’s evaluations and from subsequent evaluations. (We took evaluations on six of the shows during that first week’s run.)

In addition to the overall ratings, the written comments were important. While it’s hard to quantify comments in the same was as a rating, the comments were at least as helpful in guiding the show’s development as the ratings were.

I. Changes made to the show, based on audience feedback, in the first week: more night sky and more again (see Table 1).

The survey results here are a good reminder that our audiences really come to the dome expecting to see the night sky (and especially the local night sky) above anything else. The original draft of the show featured the sky from Galileo’s Padua but didn’t show the local Hawaiian sky. Based on feedback that people “wanted to see the stars more” and want “more Hawaii-centric discussion” (both comments from 11/18/09), we added a segment at the end of the show in which we move from the Paduan sky to that evening’s Hawaiian sky.

We tied this back to the show’s main theme by showing audience members where to look for the same objects Galileo had studied from Padua (Jupiter, Pleiades, Venus). After this change there were still occasional comments that people wanted to see even more of the night sky, but shooting for a 50-50 balance of slide and video visuals vs. night sky seems to satisfy most people.

A telling comparison: the average rating for the program’s overall quality went from an average of 4.26 for the first four performances, when we had not yet included a closing section on the Hawaiian sky, to an average rating of 4.76 in “overall quality” for the two shows at the end of this first evaluation cycle that included that Hawaiian night sky coda.

Streamlining Interactivity

The first live segment combined an overview of the skies from Padua in November 1609; a segment on daily motion; and the “let’s try to tell the planets from the stars” activity found in programs like Red Planet Mars (Lawrence Hall of Science) and Ringed Planets (Pacific Science Center). From the get-go this segment worked well as the core “night sky” segment of the program and was modified very little during all the show’s revisions.

For the other interactive segment, we adapted the Jupiter moons activity from the excellent Lawrence Hall of Science program Moons of the Solar System. In this activity, the audience is divided into groups which track the position of the four Galilean satellites over a period of 9 nights.

We originally did this as a paper and pencil activity. A number of comments said that this activity was good but that it went on for too long: “the activity—Jupiter’s moons—was too much.”

In the interest of time and tree-saving, we shortened this activity. We divided the audience into halves and had one segment watch Io and the other Ganymede, with the directive to clap when their moon completed an orbit. It drove home the point that Io speeds around the planet (three claps to one for Ganymede) and provided a form of interaction (clapping) that everyone seems comfortable participating in. When we adopted this change, we no longer received any comments about this segment being too long.

Paring Down Historical Content

The version of the show that debuted on November 13 had a lot of information on Galileo’s biography and on the historical context of the divided Italy of his time. We addressed Galileo’s birth in Pisa, his move to Florence at an early age, the return to Pisa to study and to teach, his move to Padua in 1582 and Padua’s relationship with Venice, the return to Florence in 1610, etc. (Remember that master’s thesis?)

General feedback from the November performances of the show was that the historical content, while interesting, was too much, e.g. the comment “history of Pisa and Venice” under “what didn’t you like” on an 11/17/09 evaluation. The historical context of his pre-telescope life was gradually pared down to 1: Galileo was born and spent most of his early life in Pisa; 2: in 1582 he got a job in Padua; and 3: he stayed there till the telescope changed his life in 1610.

The section near the end of the program dealing with the trial of Galileo was also pared down at one point. However, I cut it so much that one visitor said that show was “missing its third act.” This is one of the rare cases where the script was re-expanded, and cut material put back in.

The various changes made during this first week did make a difference. In the category of “overall quality of the program” we moved from an average rating of 4.00 on opening day to an average rating of 4.86 on the November 20 show. There had also been substantial improvement in the rating for “educational value” (from 4.38 to 4.86) and on “entertainment value” (from 4.13 to 4.86). This was a clear upward trend, albeit somewhat compromised by the smallness of the sample. That said, it seemed to be moving in the right direction, and we pressed onward.

Draft 2–Thanksgiving Weekend

During Thanksgiving weekend 2009 the show was still being done in the all-live format. Interestingly, there was a drop in the ratings during Thanksgiving weekend compared to the evaluations taken during the show’s mid-November debut.

One possible reason: the museum, and therefore the planetarium, was packed on Thanksgiving weekend with families with very young children. There were more kids with short attention spans and more adults unhappy with the noise from those children.

The average rating for “overall quality of program” from the four days’ worth of Thanksgiving weekend evaluations sank to 4.33 and the rating for entertainment value sank to 4.10.

Comments culled from Thanksgiving weekend ranged from insightful to depressing. As someone who has had a great love of live planetarium programming, I was surprised to get a (very small) set of comments like “I would have preferred automated show” (Continues on Page 31)
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By now everyone in the planetarium community has come face to face with the 2012 phenomenon, whether in the form of questions about the end of the world from concerned members of the general public, inquiries from local news media, or personally sitting through the film 2012 or one of countless scientifically inaccurate specials on cable television with firmly gritted teeth. The 2012 doomsday scenario was even parodied in an episode of South Park.

Those in the planetarium profession know that Earth will not flip over in 2012, nor is there any evidence for Planet X/Nibiru, and that the supposed alignment of the sun with the galactic center is neither a true alignment, nor of any scientific significance whatsoever. The Maya calendar will turn a page (or rather a baktun) with no more significance than a car’s odometer momentarily hitting a visually pleasing number (unless that particular number marks the expiration of your vehicle’s warranty), and there is no reason to expect Yellowstone to suddenly erupt on December 21, 2012. In short, barring some unexpected outbreak of nuclear war, we can expect December 22, 2012 to unfold like any other late December last-minute shopping day.

It would be too easy to collectively shake our heads at this madness and hope calmer and better-informed heads will prevail before long, but experience has shown us that unless we as a community become actively involved, misinformation will increasingly replace reason in the collective consciousness of the general public.

Thankfully, the astronomical community at large has, in recent months, begun to take up the charge and rally its forces against a vast army of pseudoscience, superstition, and snake oil salesmen.

For example, NASA Astrobiologist David Morrison has published numerous articles and blog posts, addressing the 2012 hysteria and its possible long-term deleterious effect on the public’s relationship with astronomy (a fear of the universe he terms “cosmophobia”).

Planetariums are in a unique and vitally important position to move to the forefront of this battle, given our long-standing dedication to improving the astronomical education of the general public.2 This essay will explore ways in which planetarium staffs across the United States (as have others across the world) have already begun to combat the 2012 movement.

To begin, Ed Krupp (a Maya expert himself) and his staff at Los Angeles’s Griffith Observatory and Planetarium deserve special recognition in taking a leading role in debunking the 2012 phenomenon. Not only did Dr. Krupp write a cover article for Sky & Telescope magazine on this matter, but the entire text of that article is posted for public distribution on the Griffith website, along with a FAQ of common misconceptions concerning 2012 and a link to an hour-long video of one of Krupp’s public talks on the topic, entitled “Time’s Up.”3

Neil deGrasse Tyson of the Hayden Planetarium at the American Museum of Natural History in New York has likewise posted a video of a CNN interview on the 2012 phenomenon, which is sufficiently brief to be conveniently shown in classrooms or assigned by teachers for outside viewing by their students.4

Be Available for Interviews

Planetarium directors can provide a valuable service to the community by offering themselves or affiliated staff for interviews with local television stations. For example, South Carolina State University physics professor Don Walter conducted an interview on the film 2012 for WOLO News 19 in the LP, Staban Planetarium.5

Writing articles for local newspapers debunking the 2012 phenomenon is also a productive use of planetarium staff time, as in the case of Edelman Planetarium Director Keith Johnson’s July 12, 2009 column on 2012, which appeared in both the print and online versions of New Jersey’s The Gloucester County Times.6

Since much of the misinformation concerning 2012 is being spread via the internet, it is only fitting that we use the internet as a tool in our battle against this insidious pseudoscience. Planetariums can easily include a separate 2012 FAQ or “suggested links” page on their websites, as in the case of Bakersfield College Planetarium7 and the University of Texas at Arlington Planetarium.8

Planetarium blogs can feature articles on various aspects of the 2012 phenomenon, as has been done by Casey Rawson of the Morehead Planetarium at the University of North Carolina-Chapel Hill,9 Friends of the Austin Planetarium in Texas,10 and Seth Jarvis of Salt Lake City’s Clark Planetarium.11

The Power of the Program

In addition to all this available technology, we should not discount the power of a basic planetarium show to educate the general public on any astronomical topic, including 2012. Topics such as precession, the location of the galactic center, the appearance of the Milky Way in the sky, and supposed alignments can be vividly demonstrated for the general public, allowing them to see it with their own eyes rather than reading it online (or relying on some History Channel program of dubious scientific accuracy).

For example, the Rochester Museum and Science Center’s Strasenburgh Planetarium recently completed a run of Cosmic Disasters, a star show which discussed various doomsday scenarios—including those in the 2012 community such as Planet X and Pole Shifts.12

The Planetarium at the Cleveland Museum of Natural History is currently running a planetarium program titled 2012: Doomsday, which debunks the “silliness… spreading about a global cataclysm predicted to occur when a Mayan calendar ‘rolls over’ in December 2012.”13

The University of North Carolina-Chapel Hill’s Morehead Planetarium and Science Center will soon run an interactive digital show titled The Truth Behind 2012 as part of their Science 360 series.14 Planetariums can also host lectures from outside experts on the subject, as in the case of a January 2010 public lecture by noted Mayan expert and archaeoastronomer Dr. Anthony Aveni at South Florida Museum’s Bishop Planetarium, highlighting the multicultural and multidisciplinary possibilities of planetarium programming.15

Planetarium staff can also make themselves available to speak in schools, libraries, or other public venues (as Ed Krupp has done), and can become actively involved in the debunking process by becoming a member of the editorial, writing, or fact-checking staff for 2012hoax.org, a wiki-style website which posts essays debunking various aspects of the 2012 phenomenon and shed light on the colorful personalities which promulgate this misinformation.

As one can plainly see, there are myriad ways that individual planetariums and planetarium staff members can become involved with righting the wrong that is the 2012 movement. But the planetarium community can also make a powerful impact by standing united in its opposition to this growing intellectual menace. This essay ends by urging the International Planetarium Society to consider issuing an official statement against the promulgation of astronomical misinformation surrounding 2012, in line with its official statements on the Age of the Earth and Universe and Star Naming.

We’ve Got the Time

We have nearly three years to prepare for the arrival of the date in question, an army of talented and dedicated planetarians, engaging programming and technology, and a general public who hunger for information. We can, therefore, take the king-sized lemon that is the 2012 movement and apply the sufficient pressure necessary to turn this pseudoscience into an opportunity to reintroduce the general public to all that the planetarium community has to offer. It’s time to roll up our sleeves and get to work.

12 Strasenburgh Planetarium. “Star Shows.” www.rmmc.org/StrasenburghPlanetarium
14 Morehead Planetarium and Science Center. “Science 360.” moreheadplanetarium.org/center/cfm/t
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Astronef–Planétarium de Saint-Etienne is a 12-m planetarium located in the central part of France, in the City of Saint-Etienne. It was built in 1993, at a time when there were only a very few planetariums in our country.

When the Saint-Etienne planetarium first opened to the public, it was not named Astronef, it had only 75 seats, and its astronomical simulator was a classical one, with a large central sphere full of holes and lenses, made by RSA Cosmos.

In 2003, a 6-channel digital system was installed, made by the same manufacturer. This was the opportunity for a second birth, so that the planetarium was named Astronef, which means “spaceship” in French. Since the large central sphere had disappeared, we could add seats, which brought the seating capacity 82.

Astronef was the first digital planetarium in France and the second one in Europe. The closest other planetarium is in Lyon, 60 km away from us. Astronef is an active member of APLF (Association des Planétariums de Langue Française). In 2009, we had a public attendance of about 35,000 people, out of which nearly 40% came from schools or high schools.

Our team is made of 8 full-time persons.

Astronef was built in the middle of what used to be the facilities of a very famous French company, ManuFrance, a large distributor of bicycles, rifles, hunting and household goods, and other items. In the 1970’s, Saint-Etienne faced a severe economic crisis, whose consequences still have an impact on the present population. A lot of mines and factories closed, leaving thousands of people unemployed. ManuFrance was one of them.

In the beginning of the 1990’s it was decided to transform and re-use the ManuFrance site. Now, between the building that used to host the ManuFrance offices and the one where the company’s general store was, there is a large green esplanade reserved for pedestrians. Under it there is an underground car park. And in the middle of it, there is the planetarium!

When I arrived at Astronef, in February 2006, I had a background of several years of astronomical research, so working in a planetarium was not a new experience for me. But I had a very special feeling about the planetarium, since I knew that Astronef is a very well known planetarium in France, despite its rather small size.

Its reputation mostly comes from its experience in producing shows. These shows can be watched under our dome, of course, but also in many other planetariums in France, in Europe, and even outside of Europe.

We are currently working on our 20th creation, a fulldome digital show that will present the “new solar system,” as the astronomers and planet specialists now see it and imagine how it was born. The show will be available in October 2010. Working closely with professionals of synthetic images, music composers and sound engineers, we are making a film that will feature real images obtained from space probes as well as recent scientific simulations.

This program, which is still untitled (if anyone has an idea, please let me know) will be a documentary whose script has been written by Eric Frappa, one of my colleagues at Astronef and a well-known amateur astronomer.

Our latest creation is titled Galaktos: A Tour of the Milky Way, released in October 2008. It was written by a professional author as a story for children and families. Using the classic structure of a road movie, it presents the Milky Way not as any old galaxy, but our galaxy. The characters are two robots who take every opportunity to visit interesting places in the Milky Way: a dust cloud, a cluster of very young stars, a planetary nebula, a supernova remnant, a globular cluster, and even the central black hole.

Of course, at Astronef, every performance includes a classic presentation of the sky by the means of our real time astronomical simulator. We are opened seven days a week and we offer eight different one-hour performances for the general public, each of them having its own theme. One of these performances always has no film projection and uses only the real time simulator. The other performances are divided in 2 parts: the fulldome show and the classic planetarium presentation.

(Continues on Page 32)
IPS 2010:
Exploring the cradle of astronomy in Egypt

Back to Alexandria! Two thousand years ago the world’s books came to Alexandria. The ancient Library of Alexandria became the repository of the Mediterranean world’s works of learning. When this Library was founded, the Pyramids 200 km to the south were already two millennia old, as old to the Library’s founders as the ancient Library is to us today.

The Library fostered a world-class research center. Here Hipparchus brought the stars to Earth as he constructed his pioneering catalogue. Ptolemy worked here and brought the geocentric model to near-perfection. Hypatia, the first recorded female astronomer, worked here until a mob took her life.

In a sense, then, we are traveling “Back to Alexandria, the Cradle of Astronomy” for IPS 2010, in celebration of the return of the Library of Alexandria to its prominence as a place of learning and a bastion for the history of astronomy.

The host facility: Bibliotheca Alexandrina

In 2002, the vision of the ancient Library was revived in the 21st century with founding of the Bibliotheca Alexandrina as the national library of Egypt. Anchored on Alexandria’s waterfront and rooted in timeless Egypt, the new Library also looks out to the sea and links the Middle East, Mediterranean, and the rest of the world.

Befitting its predecessor’s heritage, the modern-day Bibliotheca Alexandrina is part of the Million Books Project, an international consortium digitizing more than one million books from around the world, a resource that will be available freely to all.

Besides the internet archive center, today’s Library includes physical space for millions of books; museums for antiquities, manuscripts, and the history of science; a children’s Exploratorium; and seven research institutes.

Also befitting its heritage, the modern Library includes a planetarium that brings the stars to Earth in the 21st century. The 100-seat, 14-m facility has recently been renovated and now features a Digistar 3 fulldome projection system.

It is here that planetarians from around the world will gather for the 20th biennial IPS conference on June 26-30, 2010. We will walk where Hipparchus, Ptolemy, and Hypatia walked. Could they have dreamed of what we do? Could they have dreamed of such a gathering? Could Hipparchus have imagined the databases that reside in today’s full-dome systems or the exquisite skies of today’s opto-mechanical projectors?

The 2010 IPS conference not only connects with our historical roots. It also looks to the future. It is the first IPS conference in Africa and the first in an Arabic-speaking country. The conference will also look to the future as vendors and exhibitors show us the technology of our future in the planetarium.

Nearly all conference sessions will be held in the spacious facilities of the Bibliotheca Alexandrina. The Library contains spacious and spectacular meeting and exhibit space. The Conference Center includes the 1700-seat great hall, three 300-seat halls, smaller breakout rooms, and two 450 square meter exhibit halls.

Plenary and parallel sessions will all be conducted in the Conference Center and, of course, the planetarium will host under-the-dome demonstrations.

Vendor exhibits will be readily accessible, along with ample space for informal mixing and conversation between sessions. At least 25 different vendors are expected to be present at the conference, providing an opportunity for all to see the latest products, and the tentative program includes a generous amount of dome time for demonstrations.

Program

The conference begins with a welcome reception on the evening of Saturday, June 26 and concludes with a gala banquet on the evening of Wednesday, June 30. The days will be filled with paper, panel, and workshop sessions in addition to the invited speakers, vendor demonstrations, and a tour of the diverse facilities of the Bibliotheca Alexandrina.

The agenda includes a distinguished roster of invited speakers, including Dr. Farouk El-Baz, director of the Center for Remote Sensing.
Now you can see these places for yourself on the pre- and post-conference tours.

A half-day pre-conference tour on Thursday, June 24 will take you to the sights of Alexandria, including the National Museum, Qait-bey Citadel (built on the site of the ancient lighthouse), Roman Theater, and Pompey’s Pillar. Cost is $80 including lunch.

Two post-tours cover many of the iconic sights that have made ancient Egypt a magnet of the world’s imagination and wonder. The first tour on July 1 and 2 covers the major sights in and around Cairo, including the Pyramids and Sphinx, the Egyptian Museum, Memphis and Saqqara, Salah al-Din Citadel, and the Khan El-Khalili Bazaar. Cost is $275 including transportation from Alexandria, accommodation, tours, and lunches.

The second tour takes in several major sights along the Nile on July 3-7, traveling in the deluxe comfort of a Nile River cruise ship. Sites and experiences include Luxor, Karnak, Valley of the Kings, Queen Hatshepsut’s temple, the Memnon Colossi, Esna, Edfu, Kom Ombo, the Aswan Dams, the Unfinished Obelisk, and a felucca ride. Cost is $600 including transportation from Alexandria via Cairo, the river cruise from Luxor to Aswan, all tours, and return transportation to Alexandria via Cairo.

Delegates who wish to take both tours can stay in Cairo on the night of July 2 rather than return to Alexandria, and delegates whose international air arrival and departure is in Cai-

Contact points
For delegates: Dr. Omar Fikry, omar.fikry@bibalex.org
For vendors: Nermine Toma nermine.toma@bibalex.org

Ramsesseum outside Valley of the Kings near Luxor
The Temple of Queen Hatshepsut at the entrance to Valley of the Kings near Luxor.
The Little Star That Could

Sometimes, being average can also be special.

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With memories of the 22 July 2009 total solar eclipse still fresh in minds, less than six months later we had another major eclipse event in India: the annular solar eclipse of 15 January 2010.

This came close on the heels of the partial lunar eclipse on New Year's Day, which also was seen from India. It has been eclipses galore for India!

My colleagues Kiran Hedukar, Chandrakant Karambelkar (Chandu for short) and I visited Rameshwaram in south India to witness and capture the event as part of our planetarium’s official team. Two of our planetarium’s honorary guides, Jatin Rathod and Prabhu Velar, came to the same destination on a self-funded private visit. They volunteered to join and help us.

The altitude of the scorching sun at Rameshwaram at the maximum phase was 56 degrees. It created a very awkward angle for shooting through the directly-attached DSLR cameras that had no dockable view-panes. The standard diagonal that we had brought was focusing the image a little short of the reach of the camera, so the only option was to lie on a mattress and then raise your head like a yogi in order to put your eye into the viewfinder.

I readily gave this task to Jatin and I assumed the responsibility of a town crier. My job now was to shout instructions and timings to my team, assembled viewers (both local and from England, Bangkok and Japan) and to the crew of the Zee News television channel, which had somehow traced us here even though we had kept our location and plans quite secret.

I began shouting. “Suno, Suno, Suno! (Oyez, Oyez, Oyez!) The first contact just 30 seconds away! Shoot! Shoot! Begin shooting fast!”

The annularity lasted at Rameshwaram for 10 minutes, 12 seconds. The partial eclipse began at 11:14 IST (Indian Standard Time=UT + 5:30 hrs), with annularity at 13:16 and annularity and eclipse ending respectively at 13:26 and 15:09. It was almost a four hour event.

Many Indian and foreign amateurs and scientists camped near the northern limit of the annularity. Eclipse duration was quite short in such locations, but these were ideal for longer recording of “edge” phenomena, like occurrence of Bailey’s Beads.

Unlike the solar eclipse in July, this time most of the eclipse locations had good sunshine.

The “yellow” pictures were taken using an 80-mm aperture, 1000-mm focal length Bushnell refractor to which we attached a Sony Alpha 100 DSLR. The f-ratio was 12.5 and the exposures time was 1/160 second. An Inconel™ coated filter capped the objective end of the tube. This system was operated by Jatin.

An h-alpha filter was very kindly lent to us by Dr. Ram Sagar, director of the Nainital Observatory (called ARIES, the Aryabhatta Research Institute of Observational Sciences; you can learn more at www.aries.res.in). This filter, centred on 6563Å, had a pass band of 3Å.

Prominences did show up in the practice shots I took at Mumbai before the event, but not during the eclipse. There were just small wispy stubs. The filter was fixed at the objective end of a Zeiss 70-mm refractor having a focal length of 850 mm and had a Nikon D-70 DSLR at the business end. This system was operated by Chandu.

Kiran minded the Sony Handycam that was connected to a television so that the gathered crowd could watch the proceedings. Prabhu took off a small finder scope from one of the telescopes and attached an eyepiece adapter and took good pictures of the event. In the end we had good pictures and a dark suntan as bonus.

Another Nehru Planetarium team stayed put in Mumbai to show the partial phase of the eclipse to the public, which came in large numbers. The solar telescope (a coelostat) fixed on the terrace of the planetarium was used to project a large image of the eclipsed sun. A vid-
eo camera projected the event on a video screen in the planetarium lobby and showed the entire event in air-conditioned comfort. Thousands of people and more than a dozen TV channels thronged the planetarium.

**Our Viewing Location**

The word Rameshwaram means the Lord of Rama or Shiva. The entire ethos of this small town revolves around the ancient temple of Lord Shiva. It is a pilgrimage centre of Hindus.

The legend (as per the great Hindu epic Ramayana) has it that prince Rama (born around 5114 B.C.) came here searching for his wife, Sita, who had been abducted by demon king Ravana, whose kingdom was in Lanka (modern Sri Lanka). Before launching his war on Lanka, Rama first worshipped Lord Shiva and sought his blessings for success in war.

A grand temple now stands at the spot of Rama’s worship. It was first erected in the 12th century and has been renovated repeatedly over centuries. Rama’s army and engineers created a bridge out of rocks that could float in water and thus annexed Lanka, defeated Ravana and brought Sita back.

Today, several petty trinket shops around Rameshwaram sell pumice stone, which can float in water, passing those off as the original bits from the bridge that Rama built.
ASTRONOMYTHS

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“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!”

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Committed to reach those who usually don’t attend science outreach activities for planetariums, in the International Year of Astronomy 2009 the Navegar Foundation Team and Espinho Planetarium developed “ReachOut,” a project composed of a set of events in order to lead planetarium theatres into new grounds.

The Project

In order to promote culture, arts and science, as well as to support educational activities, the work that has been developed by the Navegar Foundation Team over the past years has paid special attention to schools, especially developing educational activities as a complement to the official school programs. As a result, we have established increasing regular attendance from schools across the country as well as from the general public.

For the International Year of Astronomy, we set a challenge for ourselves: to develop entirely new events aimed at those who had little or no contact with astronomy outreach activities for planetariums.

Several objectives were established:

• Capture general public awareness for astronomy outreach activities;
• Challenge ourselves in the search and development on new ways of captivating new audiences;
• Reach those who had never had any contact with such astronomy outreach activities as sky watching and planetarium shows;
• Allow people to experience entirely new ways of getting in touch with astronomy and science-based events; and
• Take an astronomy environment such as a planetarium and explore its use as media for broadening science education horizons.

Camping in the Planetarium

For 100 Hours of Astronomy, an IYA cornerstone project that from 2-5 April 2009 brought over 100 countries together in a planet-wide celebration of astronomy, Navegar Foundation shared the planetarium with the public in a different way: it turned it into a camping site.

First, the planetarium chairs had to be removed (it was interesting to see the planetarium floor become totally open). Second, the idea of the event. We didn’t want to have just a large group of people sleeping in a planetarium—we wanted to take those people and make them feel as if they were actually sleeping under a perfect starry sky in the wilderness. This is why our team went into the country to record the “sounds of the wild” for an entire night in order to replay them in the planetarium.

The “Camping in the Planetarium” drew approximately 40 people. The group was split in two, with one going to the rooftop to watch the night sky in our observatory and the second staying in the planetarium to watch a planetarium show called Camping With the Stars. Unfortunately, the “real sky” got cloudy during the second observation, but we still had the amazing sky of the planetarium to play with.

The evening included The Moon is Angry, a planetarium show for the little ones, a midnight snack, and a constellation hunt. When it was time to go to sleep (at 3 a.m.), the soundtrack specially designed for the event proved to be a must. We synchronized the sound so that a distant church bell rang precisely at each hour. It was possible to listen to several “sounds of the wild” through the night: bears, frogs, bats, foxes, crickets. The birds started to sing after 7 a.m. to welcome the sunrise and at 9 a.m. the rooster sang, causing a general laugh.

Immersive Film Festival

Next, trying to reach cinema enthusiasts, we held Immersive Film Festival 09. In order to share this new experience, a technology non-existent to date in Portugal, Immersive Film Festival opened its doors especially for schools to allow students to access this new media. We were not only able to captivate the audience through a entertainment, but also show the planetarium’s true potential: that astronomy could share space with many scientific fields of expertise, such as biology, history, geology, and more.

Approximately 30 different productions were shown on projection equipment kindly provided by Eveans & Sutherland, and the festival also featured competitive sections sent from all over the world, including Japan, Unit-
ed States, United Kingdom, The Netherlands, France, Australia, among others.

**Celestial Heralds**

The Medieval Journey in the Land of Saint Mary is held annually during 10 consecutive days in the historical city of Santa Maria da Feira, attracting 50,000 people each day. It is one of the largest medieval fairs in Europe.

Navemar Foundation challenged the event’s organisation to have a theme area dedicated entirely to astronomy for the 2009 festival. They agreed and Celestial Heralds were born. From the 30 July to 9 August, we had a portable planetarium with a theatrical play, sundial workshops, and telescopes, all disguised for the occasion with a medieval look. The main goals were to give some insights on how medieval people saw Earth, a much different vision of what we know today after the first use of the telescope by Galileo.

We built a medieval tent around the portable planetarium. A theatrical play was written around the medieval concept of universe and the new way of thinking after Galileo’s findings in a dialogue between an astronomer and a friend, a cleric. A team of actors and actresses gave life to this event. The celestial scenario was projected on the dome by a fulldome projector kindly provided by The Eluminati. The visual content gave special emphasis to Galileo’s drawings of craters on the moon, spots on the sun, rings around Jupiter, and had sundial workshops and our “Celestial Heralds” were ready to spread astronomy in medieval times. Photos by Espinho TV, used with permission.

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**Dinner on Mars**

Have you ever wondered how it would be interesting to notice a substantial increase on the number of attendees in several outreach activities that were later organized in our own institution. For this event a conservative number of participants would be 6,500.

The “Dinner on Mars” concept captivated people who usually don’t go to science events. The majority had never had been to a planetarium, but because it was a different kind of event they decided to join. We were gladly surprised when, at the end, we heard that they wanted more scientific content and more information.

Our evaluation has to be more than simply numbers. It was important to captivate people who never had any contact with planetarium outreach events before. It was also rewarding to have people waiting to participate in the future, therefore establishing a solid set of events sustainable and repeatable in years to come.

Being able to use the planetarium for multiple events apart from traditional show presentation was also achieved, broadening the horizons of our planetarium. Although “ReachOut” was an IYA event, it has become an ongoing concept that will allow us to explore new ways of communicating science and experiences on planetarium theatres.

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**Feedback and Conclusions**

“Camping in the Planetarium” sold out weeks before and had a long waiting list. We still have people asking to repeat this event. The direct feedback was that the event was a very educational experience, innovative and fun.

Each session of the Immersive Film Festival was restricted to the 80 seats of the planetarium. All 48 showings over the three days of the festival sold out and we had approximately 4,000 attendees, including international participants from UK, USA, China, France, Italy, Russia and Spain.

The availability of fulldome technology, new to Portuguese audiences, maybe responsible for the sold-out showings. The references and positive comments from the media, mostly newspapers, confirmed a high degree of satisfaction among the public.

Regarding “Celestial Heralds,” we had trouble quantifying the number participants due to the nature of the event. However, it was interesting to notice a substantial increase on the number of attendees in several outreach activities that were later organized in our own institution. For this event a conservative number of participants would be 6,500.

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**Acknowledgments**

All these activities would not have been possible without sponsor support. We would like to give a special thanks to “Feira Viva,” the organizational entity of the “Medieval Journey in the Land of Saint Mary”; to The Eluminati for kindly providing a fulldome projector for our portable dome in “Celestial Heralds,” and to Evans&Sutherland for lending us the Digistar projectors for the “Immersive Film Festival” and “Dinner on Mars.” Without their kindness and support none of these projects could become true.
Dear Fellow Planetarians:

I hope that 2010 has started well for all of you, and hope that your plots and plans flourish.

The countdown to the IPS conference in Egypt has now started. By the time you read this, all of the details should be posted on the IPS website as well as the Bibliotheca Alexandrina web pages.

If you are wondering whether you should go or not, I can provide some local colour for you. The city is on the shores of the Mediterranean and is separated from the sea by the Corniche, a multi-lane road which hugs the coast. The city was founded by Alexander the Great and was named after him so it has a long history.

The Nile: Bigger than Alexander

In fact, the history of the Nile River and the delta is even more venerable than Alexander, as it is one of the places where humans first settled along a reliable water course and started to farm their food. The river provided abundant fish and other wildlife for food, and their grain crops were nurtured in the dark-coloured silt that was brought down by the reliable seasonal floods from the Ethiopian Highlands. All of this is documented in the wonderful carvings of everyday life in the temples and tombs of the Pharaohs and their people.

The society which emerged along the Nile valley was very hierarchical. The old suppositions that the pyramids and other grand architecture were built by slaves has now been revised with the discovery of the towns where the construction crews lived, adjacent to the massive buildings.

The conference has two excursions planned at the end of the event, one to see Cairo and the pyramids at Giza and the other to the south to Luxor to see the temples of the upper Nile. During the conference there will be a chance to see the well-preserved artifacts in the city, including one of the world’s first universities.

The city is huge and sprawling. The easiest way in is by air, but I have also travelled from Cairo to Alexandria by taxi. It is a long journey across the flat delta of the Nile, so an air conditioner will be an essential fitting in the vehicle. I would not recommend driving as the local driving customs are most kindly described as startling, so I would say that local traffic knowledge is crucial.

The venue for the conference is the new Library of Alexandria, rebuilt on the Corniche and named as the Bibliotheca Alexandrina. From the plaza in front of the space-age library building, you can look across to the harbour to the ancient fort and the site where the Pharos Lighthouse once stood as one of the Wonders of the Ancient World.

Alexandria has that characteristic bustle of a great trading city. The traffic is constant, heavy, and noisy. You will know that you are on the African continent. The cafes and coffee bars bordering the Corniche serve sweet espresso coffees, pastries and hookah water pipes and it is very pleasant to join the locals at sundown and sit outside to watch the passing show.

Confessing an Obsession

I think that it is time for a confession: my obsession with gadgets and new technology is all consuming. Mea culpa. I am actually a high-tech gadget freak. I just adore gadgets that do precisely what they say on the box.

My current favourite is my iPhone. It just works so well, and almost set itself up. Its only failing is a regrettable fragility, discovered when my cat Felix decided to play with it and boxed it on to the tiled floor with a swift left paw. The touch screen did not survive.

It was probably all my fault as I had been demonstrating the Koi Pond application to him a little while earlier, and he was mightily impressed by the e-fish swimming in the e-water and the splashy e-noises when he touched them with his paw. I am sure that he was trying to catch one. It was easy to fix the broken screen, and Felix’s allowance has been cut for the next year.

I assume that many of you, like me, still have the mental scars of earlier encounters with “easy to set up” wireless routers which were anything but easy. My wireless devices are almost all Apples now and they work brilliantly.

I have also just broken one of the first rules of guys and gadgets by buying and reading a manual for Mac OS X Snow Leopard. It’s amazing the stuff those programmes actually can do when you read the manual!

I am actually dreading seeing the latest jewel in the Apple empire’s crown. It looks like as soon as I lay my hands on an iPad it will be sold, and I will be facing a life of outsize pockets as it looks a mite bigger than my standard pants and shirt pockets. Will we see special iPad vests? You read it here first.

But They Can’t Beat …

I have to say that my all-time favourite astronomy gadget is the Hubble Space Telescope. I remember reading about what it was going to be capable of before its launch in 1990. I also recall the huge disappointment when the first blurry images came back and the optical fault was identified. I thought that NASA had blown it.

However, my gadget faith was renewed in spades when the December 1993 servicing mission flew to repair the Hubble’s short sight. As I am very short-sighted I was hugely sympathetic; I still can remember my astonishment at the details revealed by my new specs when I was 10.

The results that the Hubble Team released following the optical corrections were just mind blowing. I had grown up in the era of black and white and the Voyager flyby solar system missions that yielded amazing detail and colour, but the HST’s new abilities surpassed all that had gone before.

Now 19 years old and counting, Hubble’s popularity was reinforced when the decision to allow it to die was rescinded and it was given a further lease of life with the final May 2009 servicing mission. I don’t know how you feel, but in my opinion I think that the joint NASA-ESA Hubble image releases have done more than almost anything I can think of to popularise our subject. Who is not awed by the spectacular M16 Eagle Nebula images capturing the birth pangs of juvenile stars, or by the explosive remnants of Eta Carina?

For me, the most impressive HST image is the Hubble Ultra Deep Field with its population of 10,000 galaxies, each containing billions of stars. The most mind expanding part of it is explaining to our young visitors that this image is just a teeny bit of the heavenly sphere. It gives a perspective to us humans, and allows us to appreciate the immensity of the cosmos and the need for us to keep looking for all of the other hidden secrets that remain to be discovered.

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To start this article, I thought it would be appropriate to give you an update on my New Year’s goal from the December Planetarian: the resolution to learn in 2010. Working on that goal, I am taking a course on environmental systems connections.

**Note 1: Professional Development**

Astronomy programs are sometimes difficult to find, either geographically near you or at a level suitable for your experience. Often the first step to find useful development opportunities is to join an astronomy list group, such as Dome-L, the Museum Alliance, or a regional information email list.

Another option is one we forget from time to time that we ourselves are very skilled in our area. We can lead the professional development opportunity. Most of the articles and resources on professional development agree that there are four areas you need to think about when preparing a PD opportunity: topic, audience, duration, and level of participation. Another item that can be added is a post-experience survey, which is useful for adapting for future presentations.

**Topic:** An important part of developing a PD opportunity is to choose a single topic or theme. The topic does not have to be on astronomy. For example, if you use audience participation, then think about focusing your topic on how you accomplish it, such as on remote “clickers” or other devices you may use.

This use of narrow focus ties back to your experiences as a planetarian. You know not to overwhelm the audience with information, nor would you start a presentation on Olympus Mons and then jump to cosmology.

**Audience:** Understanding the information your audience already has is important. If you are the fourth presentation this group has in a year on grouping strategies, then you need to be ready for some advanced questions. If you are the first, then be prepared to provide entry-level, basic information.

**Duration:** For your first time leading a PD opportunity, an hour is long enough. Remember that an audience needs to be re-stimulated every 20 minutes to remain engaged, so plan for multiple activities or transitions to keep your audience’s attention.

**Level of Participation:** Are you going to be a sage on the stage or guide on the side? The group’s level of participation covers a spectrum from lecturing to the audience to facilitating the audience’s learning through experience.

I recently ran a PD event for a group of elementary teachers on the scientific method, focusing on inquiry and hypothesis. The opportunity was lasted about 25 minutes at their monthly faculty meeting. Each group of 4 teachers got two opaque film canisters, one a quarter filled with sand and the other containing a small bolt. The lids were sealed so they could not sneak a peek inside.

The teachers manipulated the canisters and made a list of possible contents. Then they made a master list of possible contents, putting tally marks next to repeat items. They were then asked to hypothesize a method of figuring out the contents without opening the containers.

I then revealed the contents to the group and they placed check marks next to tests that would have worked and x’s next ones that would have failed. During the post experience survey, many teachers noted that they started to think about different tests they would run on the sample while they were manipulating the canisters.

**Note 2: Planetarium Alliances**

A couple of my students are working on short presentations and wanted to know if they could collaborate with a student in another class. This is normally when someone makes a comment about no one being an island and no planetarium is a single star. However, if you are reading this, then you are already a star within the IPS galaxy. With many planetariums operating with smaller budgets, alliances and partnerships are beneficial to providing content to the public.

A partnership that my planetarium has created is with local television and radio stations for use of sound booths and green screens.

Try to remember that you are going into the season that is full of professional opportunities. If you are not able to find a professional development experience that fits your needs, then don’t be afraid to lead your own.

**Planet Biographies**

The lesson plan for this article is for planet biography cards; or, in student-speak, trading cards for planets.

**Lesson Idea: Planet Biography Cards**

After a presentation on the solar system, inner/outer planets, or (my favorite) planet vs. dwarf planet, the students, working in small groups, make a trading card set for the solar system. The cards use three literacy skills (graphical representation, summarizing, and fact filtering) to help the students transfer the experience to long term memory.

**Supplies:**
- Card stock (3 sheets of card stock per group)
- Markers/crayons
- Astronomy textbooks
- Computers
- Suggested web resources:
  - www.nineplanets.org
  - solarsystem.nasa.gov
  - www.esa.int/esaKIDS/SEMF8WVLWFE OurUniverse_0.html
- Object list, containing: sun, Mercury, Venus, Earth, Mars, Ceres, asteroid belt, Jupiter, Saturn, Uranus, Neptune, and Pluto.

**Preparation:**

As a time-saving method with younger groups, I prepare the card stock for them by cutting them into quarters (cut the paper in half along the vertical and then again along the horizontal axis). Stack the cut cards into sets of twelve for each group.

Set up stations for the students to rotate through during the post-presentation experience; a good plan is to have three stations per 9 students. Station 1 is coloring; Station 2 is textbooks, and Station 3 is web resources (computer access).

**Procedures:**

Group the students into sets of three and give each group a stack of cards. Students who start at Station 1 will be drawing pictures of the planet/object (one per card); the opposite side will contain text about the object. Station 2 has textbooks for the students to write a three-sentence summary about the planet/object. Station 3 is where the students will use web resources to list 5 statistics about each planet/object. Have the students rotate to the next station every 15 to 20 minutes.
Last time I asked a question that I felt was very important for the future development of our industry, namely the enhancement of dome usage. That’s why I decided to ask the opinions of well-known planetarium specialists who are pushing the envelope of fulldome applications. The question was:

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

The future of our profession could well depend on us exploring new applications for the digital dome, particularly real-time applications. Giant screen film theaters are soon going digital, and will be capable of running linear planetarium programming.

Digital planetariums, however, are unique as pioneers of real-time visualization. What if we begin to see digital domes as immersive, interactive web portals into curated scientific simulations and visualizations? This would require interconnectivity on a worldwide photonic dome grid with massive server nodes capable of streaming both fulldome imagery and dataset textures. Such a system would support “serious games” tournaments, domecasting of live events, and immersive camera feeds allowing real-time telepresence on space missions, for instance.

There will always be a place for linear shows. However, show topics can and should broaden for facilities that are not expressly limited to space and astronomy programming. The idea that a planetarium is a de facto star theater is outdated. Already we are seeing science education programming ranging from undersea explorations to environmental topics. The digital planetarium is a powerful (and expensive) immersive visualization delivery system.

Limiting digital planetariums to presenting star lore, unless demanded by institutional theme or charter, withholds a cornucopia of inspiring possibilities for audiences to experience.

Finally, many planetariums have explored cultural arts presentations over the years with ballet, live concerts, pop music and more. Like the Florentine Camerata of the Renaissance era (that included Galileo’s father), modern planetariums are pioneering new art forms that may one day reach the stature of opera or other cultural arts.

The digital dome sits at the crossroads of science, technology and the arts. And because it is a powerful media delivery system, it can have a profound effect on our consciousness. We owe it to ourselves to explore this new medium’s unique educational, inspirational and transformative properties.

Ed Lantz, Founding Director
IMERSA
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My use of a hemispherical dome (planetarium) is science visualisation that is, using computer graphics to convey datasets to researchers and the public in informative and engaging ways. Stereographics has long been used in visualisation, the benefits of depth perception are well understood to be advantageous.

Besides stereoscopy, another characteristic of our visual system not utilised by flat panel displays is our wide field of view. A hemispherical display is obviously one way to present a virtual world that fills our visual field, immersing a viewer so they see none of the real world (there is no frame around the display). Whereas stereoscopy can be problematic when a user wishes to be inside a dataset, an immersive display like a dome is ideally suited for being inside something.

In addition to the immersive nature, when one wishes to be inside a dataset on a flat display one is continually rotating the camera in order to look in different directions. A hemispherical fisheye view projects half the possible field of view simultaneously.

The iDome is an extremely rotated dome, 90 degrees to a traditional planetarium dome. Some examples of its use at University of Western Australia can be found here: local.wasp.uwa.edu.au/~pboure/exhibition/mv2009.


It certainly is possible to expand the application range of fulldome! I’ve seen numerous wonderful artistic and science visualization projects on the dome.

Since going digital, we suddenly find that we can project anything we want onto our domes. While astronomy still dominates the field, a number of other subject areas are beginning to be expressed on the dome.

At the Ott Planetarium we’ve explored architectural visualization, molecular visualizations, geographic visualization, and abstract visualizations using 3D arrays. We’ve also started working on fully interactive 3D full-dome applications using the new capabilities of the Blender Game Engine.

Paul Bourke
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Let’s turn back to planetariums and astronomy for the June issue. In January IYA2009 was officially ended, but activities undertaken in the past year, I hope, will continue to affect us now and in the future.

Each planetarium, museum, and university sponsored many events that were dedicated to IYA2009. Some of them were usual, and some was really great and done for the first time. For example, the public advertising of IYA using large commercial billboards was done by my Nizhny Novgorod Planetarium. Such astronomical advertisement might have been done for the first time ever in Russia. So, my question now is:

What was your greatest achievement during International Year of Astronomy 2009, and why?

Share your successes with us!
and, more sharply, “live narrative made presentation seem cheesy.” It was a little sobering to see that a subset of audience members really would prefer an automated program.

Those comments, however, were far outnumbered by comments about how the “human narrator with tons of enthusiasm” and “expertise and love of the subject by the narrator” were highlights of the show. Still, I’d never heard live narration called “cheesy” before. I tried not to take it too personally.

II. Changes made to show based on evaluations from Thanksgiving weekend: cut the astronomy that didn’t fit the “through line” of the story.

Ten percent of the Thanksgiving weekend audience members said the show was “too long” and 5% said that the show had “too much content.” In addition, several responders said that “the length” was specifically what they didn’t like about the show.

In the drive to get to a show were all audience members said the length and content were “just right,” even the astronomy that did not fit the story’s through-line (“the ways in which Galileo’s telescope helped Galileo prove that Copernicus was right”) was cut. Thus, while we kept the segment about Galileo finding dozens of hidden stars in the Pleiades, we cut the section about him finding additional stars in Orion’s Belt, because it was redundant.

Small cuts were made again on the historical background, and since the shows that ran 35-40 minutes had a significant subset of audience members saying the program was “too long,” I made a conscious effort to bring the program down to about 32 minutes. I hit this target by the last day of Thanksgiving weekend. From this point, the comments about the program being “too long” evaporated.

The Automated Show

By the end of Thanksgiving weekend I felt that we had enough data to create the automated segments of the show. Ken Miller recorded the narrative and Brad Evans on our staff edited the first version.

Because I wanted to maintain the flexibility in testing and cutting, we played Ken’s narrative from a CD for the next two weeks, bringing music up from a secondary source to leave the program with music. The Spice program was manually advanced by the presenter during the rough-cut version of the recorded show.

Interestingly, when we debuted this “half-recorded” format, the average ratings went down slightly, even compared to the infant-heavy “all live” programs of Thanksgiving weekend.

Overall quality rating for the half-recorded program came in at 4.21, compared to 4.33 for the all-live shows over Thanksgiving. Eight percent of audience members said the part-recorded show was “too long” and 7% said it had “too much content.” This was despite the fact that the show had been cut down from the Thanksgiving weekend version.

Why? One possibility is that audience members might be able to absorb somewhat more content from a live presenter than from a recording, even if the content and even the wording is almost identical in each case.

That said, people also commented on the appeal of the mix of live and recorded elements. From 12/11/09: “shift from recorded to specific (live) explanation was excellent.”

To keep the ability to change the programming quickly I used GarageBand to edit Ken Miller’s narrative, making new versions of the narrative soundtrack on a one-day turn around.

III. Changes based on evaluations of the first “half recorded” version: more cuts to astronomy content.

The segment on Galileo’s blobby view of Saturn was cut because it didn’t really tie in to the “prove Copernicus right” narrative. A segment on sun spots was also cut even though the discovery of sun spots did support the through-line to a certain extent (in that a spotted sun is, at very least, anti-Aristotelian).

The program originally discussed Biblical evidence for geocentric (the sun being stopped for Joshua) and Aristotle’s views. While people could often relate to Joshua’s story, the Aristotle story was more important for the through line of the program and was kept. Joshua was cut.

Final Version—New Year’s

Over the last week of December, we mixed the honed narrative with Davo Coria’s final music tracks, and fully automated the visuals to the soundtrack.

In this final version from the last days of 2009, the overall quality rating for Astronomy of Galileo was 4.43, higher than any other sampling except for that one set from 11/20/2009. Education value came in at 4.60 and entertainment value at 4.38. It is interesting that 8% of the responders on that New Year’s weekend said that the show was “too long” and that 8% said the show had “too much content.” (In the latter case, this is balanced out by the 8% who said the show had “too little content.”)

The program had reached my goal of beating a 4.25 average rating on “overall quality,” after starting with an average rating of 4.00 in the category on opening day and then sinking below that level (to 4.21) in the first run of the half-automated show.

In terms of audience comments, people liked the “mixture of video and discussion” and “when we got to participate.” Since most of the slides and video was now automated, transitions between the live and recorded segments went more smoothly than in rough-draft earlier versions.

IV. Information gleaned from audience comments: while audience comments are not as neatly summarized and quantified as the ratings are, they can sometimes provide even more valuable information.

To get a handle on the comments (both “what did you like most” and “what didn’t you like”), I broke the comments down into categories. Of the 164 comments under the header “what did you like best,” 69 pertaining specifically to the night sky. Again, a reflec-

(Continues on next page)
tion of what the public wants to see in the dome! (Table 1)

Beyond the “night sky” category, “history” received the second-highest number of positive comments, at 22 (under “history” I include comments about the Italian history of Galileo’s time; biographical information on Galileo; and history of astronomy). Comments related to the live narrator came in at 18, and 17 responders said that they liked the interactive elements of the show best.

As with the cliche that museum audiences will never give you their full attention if they really have to go to the bathroom, comfort issues were an issue for these 25 responders. The issue of crying/noisy children is a thorny one. We do not restrict young children from our dome for several reasons: Hawaii is a particularly family-oriented place, it’s relatively easy to leave during the show, and most of our audience members are considerate about doing so if their child is restless.

We started providing a stronger version of our standard “if you have a crying or restless child, please duck out through either exit, out of courtesy to all” and this seems to have mollified the situation.

Beyond these comfort issues, no other category of complaint gets more than a few comments. There are many items that get one or two comments, from my talking too fast to the child who didn’t like it when “Galileo went to jail”; but, unlike the positive comments, there are not any pronounced patterns among the other negative comments.

### Conclusion

The data here are also a good reminder: our audiences come into the dome expecting to see the night sky. That is the one thing that the planetarium does better than any other medium ever invented. Give them that, while making sure it ties back into the key points of your program.

Live interpretation is something the visitors overall rate very highly. Eighteen responders listed some aspect of live narration as the best part of the program, and 17 listed the interactive elements of the show being their favorite parts.

Programming that combines both live and automated segments gets ratings in the same ballpark with the ratings for programs that are 100% live; customers commented in the final evaluations that the finished show had a good smooth mix of live and recorded segments.

I urge us all to find ways, as we create shows, to adapt our programs quickly based on audience feedback. So often we either don’t ask for feedback, or get feedback and then let the evaluations sit in that ol’ box in the office because no one has made time to assess and react to the evaluations.

Avoid that trap, even if you as the producer have to go back after each show and spend 20 minutes reviewing the ratings and comments and thinking about appropriate changes.

If you really use evaluation as a tool to refine a planetarium program and give yourself the flexibility and structure to change your show based on that feedback, you will come up with a better show than the one you started with. It really helps to ask the audience what they enjoy and don’t enjoy, what works for them and what does not work for them. In the end, I hope you’ll find it works for you too.

### Table III.

<table>
<thead>
<tr>
<th>Category</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crying/noisy children</td>
<td>7</td>
</tr>
<tr>
<td>Hard to see all slides/projector in way</td>
<td>5</td>
</tr>
<tr>
<td>Planetarium hard on neck</td>
<td>4</td>
</tr>
<tr>
<td>Looking at back of room</td>
<td>3</td>
</tr>
<tr>
<td>Head turning</td>
<td>2</td>
</tr>
<tr>
<td>Chairs smell</td>
<td>2</td>
</tr>
<tr>
<td>Front row seats</td>
<td>1</td>
</tr>
<tr>
<td>Seats don’t recline enough</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total comfort/view issues:</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

The performances we give to the school pupils have a different duration (90 minutes), and we try to adapt their content to the teachers’ wishes as much as we can. Every month, we offer a Tuesday night lecture, taking this opportunity to invite experts who can share their passion with the public and explain the latest discoveries in their research field.

I like very much working at Astronef. My colleagues become dear friends and we have strong partnerships with local cultural and scientific institutions. Most importantly, our public tells us that it likes what we do.

I know how lucky I am to do this job. I have always loved astronomy, physics and space sciences, and working in an institution whose primary purpose is to expand the public understanding of these fields is so exciting. When I was young, I was afraid of failing to get a job where I would always be learning something; I can say that all my wishes were fulfilled with this job!

I also have found that having so many friends in the scientific and planetarium communities is something special that gives you strength and confidence. This is why I do not doubt that Astronef will be given the means to carry on its activities in 2011 and the following years.

Why do I say this? It is because our present status is going to be re-examined by the new administration at the City Hall of Saint-Etienne. We have been told that the city has to wonder whether there is a part for Astronef in its cultural policy that Astronef is expensive (yet we are the cheapest of all the cultural equipments in Saint-Etienne after a music theater!), that we will have to open the planetarium to “other activities,” and that the staff will be reduced. This explains why we had to withdraw our bid for an IPS conference.

The future for Astronef is still unsettled. But my colleagues and I are still convinced that we will succeed in getting Astronef out of the field of political rivalries and that goodwill and rational reasoning will defeat all the a prioris and misconceptions about who we are and what we do.

---

**PARTYcles**

- I’m an electron
- I’m a proton.
- You only get one chance at making a good first impression.
- OK... take it easy, Tiger. He is smiling at you.
- Subatomic, actually...
- Err... Do you think it is going to rain?
- Oh no! Small talk!

---

*(Under One Dome, continued from Page 17)*

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Our Living Climate

Our Living Climate is an engaging fulldome primer about the history of climate change on Earth. Suitable for school years 5–10 and general audiences, this quality production deals with 3 key themes:

• The Earth’s climate is a complex system that has changed over time
• The Earth’s atmosphere sustains life and has been built by life
• There are important similarities and differences between Earth and other planets

Visually dramatic and documentary in style, it includes comparisons of Earth and its nearest neighbors, the Moon and Venus. It highlights their histories and the delicate atmospheric balance required to support life. We are then immersed in the story of Earth’s climate, travelling through time to view the dependent interaction between climate and life during the evolution of our planet. A mass extinction event, an ice-age and the advent of the industrial revolution are described in detail.

The presentation helps audiences to understand how scientists study constant climate change and how we, as humans, have the opportunity to impact the climate, for better or worse.

Our Living Climate—the greatest scientific challenge of our time.

Produced by Museum Victoria. Approximate running time 28 minutes. Suitable for ages 10 and over.

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FORCES OF NATURE

Witness the awesome power and the unimaginable destruction of explosive volcanoes, ground-buckling earthquakes, and deadly tornadoes as you head into the field with scientists who risk their lives exploring the origins and behaviors of these fearsome natural disasters.

• Venture to the brink of an erupting volcano on the Caribbean island of Montserrat.
• Cross the Midwest’s infamous “Tornado Alley” with storm-chasers racing to unlock the secrets of monster twisters.
• Discover how the history of massive, city-leveling earthquakes in Turkey is helping scientists predict where and when the next quake will strike.

It’s a spectacular, up close glimpse of the Earth’s most destructive forces! Narrated by Kevin Bacon. Approximate running time 40 minutes. Transformed from giant-screen film by Sky-Skan.

Produced by National Geographic and Graphic Films, Inc.

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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 Oort 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**
- **Sloan Galaxy Survey v6**
- **Milky Way + Extra Galactic Digital Universe 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 Predicts: Three Solar System Sets, Two Constellation Sets, Messier Set, Updated Digital Universe, DS Basics, and More**
SOLAR STORMS
A Tale of Twin spacecraft

Coming Soon to 2D and 3D Theaters

From Earth, the Sun cannot be looked at with human eyes. Solar Storms gives the audience the opportunity to see the Sun up close. 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 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.

Solar Storms for fulldome is no mere spherical transform but a completely custom scene-by-scene reproduction.

Fulldome Version Produced and Distributed Exclusively By Sky-Skan
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Lesson Plans and Copyright

Back in November, the New York Times ran an article about the growing number of teachers who sell their lesson plans and other curriculum materials through online portals like TeachersPayTeachers.com (Winnie Hu, Selling Lesson Plans Online, Teachers Raise Cash and Questions, Nov. 15, 2009). The article quoted Robert N. Lowry, deputy director of the New York State Council of School Superintendents, who suggested that if school district resources were used in the creation of materials that are subsequently sold for profit, the district should get a share of the proceeds.

I have written about works-made-for-hire and the basic rules relating to when an employee or his/her employer owns a particular copyrighted work. In this column, I revisit the concept, but with specific application to those who teach in schools, colleges, and universities, as many planetarians do.

I performed a very cursory review of about a dozen major school districts’ teacher employment agreements (the ones negotiated with the large teachers’ unions) that I found online, and found none that contained anything about copyright ownership. Absent a written agreement to the contrary, it seems as though the “default rules” of copyright would likely apply to teacher-written instructional materials.

On its face, the copyright law as it relates to employees and employers seems pretty straightforward: if the work in question was created within the scope of employment, the employer is deemed the author for copyright purposes, and thus, the copyright owner. In Community for Creative Non Violence v. Reid, 490 U.S. 730 (1989), the Supreme Court instructed that to determine whether the creation of a certain copyrighted work falls within the scope of employment, we must look to widely-recognized common law agency principles. The court explained:

In determining whether a hired party is an employee under the general common law of agency, we consider the hiring party’s right to control the manner and means by which the product is accomplished. Among the other factors relevant to this inquiry are the skill required; the source of the instrumentalities and tools; the location of the work; the duration of the relationship between the parties; whether the hiring party has the right to assign additional projects to the hired party; the extent of the hired party’s discretion over when and how long to work; the method of payment; the hired party’s role in hiring and paying assistants; whether the work is part of the regular business of the hiring party; whether the hiring party is in business for itself or in business for others; the provision of employee benefits; and the tax treatment of the hired party. No one of these factors is determinative.

490 U.S. at 752-53 (citations and footnotes omitted)

So, determining whether certain teacher-created materials are copyrighted by the school district requires an analysis of the circumstances around which they were created.

At first blush, it seems as if the copyright is clearly owned by the school or school district. Teachers are generally not in business for themselves, but rather are employees of the district in which they teach and for which they created the curriculum materials. To my mind, where the analysis becomes a bit murkier is in considering factors like the “source of the instrumentalities and tools,” “the location of the work,” and “the ‘hiring party’s right to control the manner and means by which the product is accomplished.’”

While some curriculum materials are probably created at school, using school resources, teachers do a substantial amount of work outside of regular working hours, often using their own resources and spending their own money. To the extent a teacher creates materials outside of regular school hours, without using any district resources—e.g., on their own computer at home—the balance tends to tip in favor of the teacher owning the copyright.

Moreover, it’s unclear to what extent developing curriculum materials is actually part of a teacher’s job requirements. That may sound a little odd, since it would seem that developing teaching materials is a prerequisite to actually teaching, but I’d imagine that most teachers could, if they were so inclined, by using standardized, district-provided materials, or materials created by third parties.

I concede that I have no significant teaching experience myself, but I was a student for a long time, and had my share of teachers that I’d bet hadn’t created an original lesson plan since they were required to as part of their education courses in college. Nobody has fired them yet, which suggests to me that just showing up and teaching the same old stuff year after year is sufficient to meet the basal requirements of being a teacher.

Where Does Material Wind Up?

So, what does this all mean for copyright ownership of teacher-created curriculum materials?

Like most things in law, the answer is: it depends. Absent a specific agreement dealing with copyright ownership issues, the answer depends on the facts and circumstances surrounding the creation of particular curriculum resources on a case-by-case basis.

A more interesting question for me, as a policy matter, is how should school districts treat the copyright interest in teacher-created curriculum materials? As the New York Times article notes, “[t]he marketplace for education tips and tricks is too new to have generated policies or guidelines in most places.” So, I offer a few thoughts that I hope school districts will keep in mind as they set out, as many will do in the future, to create such policies.

Most institutions of higher learning—both public and private—have explicit intellectual property policies that govern the ownership of intellectual assets created in the course of a professor’s employment. Typically, although not uniformly, most such policies allow professors to retain the copyright to teaching and curriculum materials as well as other scholarly pursuits, such as books, articles, and the like.

Here’s the relevant portion of the policy from my alma mater, Lehigh University (available in full at www.lehigh.edu/policy/university/ip.htm):

Traditional Academic Rights: In keeping with academic traditions at the University, the creator shall retain ownership to the following types of Intellectual Property, without limitation unless part of an agreement under the above principles of ownership: books (fiction, nonfiction, poetry, textbooks etc.), articles, poems, published standardized tests, student papers (themes, term papers, reports, exams, etc.) musical works, dramatic works including any accompanying music, pantomimes and choreographic works, pictorial,
With Giant Screen and Digital Domes Converging, a New Community is Emerging
In the eyes of special venue media producers and distributors, a significant new market is emerging—a network that includes 2D and 3D giant-screen theaters as well as fulldome, and connects the interests of planetariums and science centers.

The two types of institutions already have a lot in common—such as similar missions and audiences and a tilting toward the latest interactive and immersive exhibition technologies—but the sharing of content, facilitated by digital processes, is really just getting started.

It’s a marker of the “convergence” of giant screen cinema—which in educational institutions is still mostly film-based—and fulldome digital video.

Two major producer/distributors contributing to the convergence by investing in this combined market are nWave Pictures and distributors, National Geographic, is developing an original title familiar to one sector has a good chance of being new to the other, and formatting or repurposing can go in either direction. In March 2009, at the Giant Screen Cinema Association (GSCA) Film Expo, SK Films introduced Molecules to the Max!, a 1570 film version of the fulldome Moleculararium, and the first fulldome production to be repurposed for giant-screen film exhibition.

Conversions and Versions

As the digital dome network becomes an increasingly valuable target for media producers and distributors, they begin to plan their productions with multiple formats in mind. Consultant Paul Fraser reports that his client, National Geographic, is developing an original new fulldome production.

Fraser, who heads Blaze Digital Cinema Works, is a specialist in out-of-home digital motion picture presentation and sits on the IMERSA board of directors. He negotiated the Sea Monsters and Forces of Nature fulldome distribution terms with the fulldome vendors on behalf of National Geographic.

“To turn a 1570 film into digital fulldome, you have to first scan it to a high resolution digital file, then stretch and warp it to reformat it for a dome master,” notes Fraser. “There are post-production companies capable of providing this service, but it is a lot of work, and expensive. Another expense is the slicing and encoding for each individual theater, although this is not necessarily an expense for the distributor, as theaters often do it themselves. And of course, 3D costs more.”

3D rendering is already used in dome productions, but Fraser is referring to stereoscopic 3D, with separate right- and left-eye images viewed through 3D glasses. “Right now, there are very few stereo-equipped fulldome 3D theaters, the Imiloa Astronomy Center of Hawaii is one but it could snowball,” he says. “If a distributor already has the 3D film asset, they are way ahead of the game—they just need the money to do the scan.”

Sea Monsters was a logical candidate for a 3D fulldome treatment. “Even though there aren’t many 3D fulldome theaters right now, we know it plays very well in 2D and our research with planetarium directors confirmed strong interest in this title,” Fraser explained.

“And the fulldome system vendors thought the high-quality of the production and provocative title, with its combination of CGI and live action, would help drive interest in 3D upgrades and new 3D system sales, and therefore, 3D licenses of the show will follow, eventually.”

How many theaters does a distributor need to make it worth the expense of conversion? “It depends on your assumption of the average license fee,” says Fraser. “For 2D, it is somewhere in the area of six to eight theaters licensing the show. For 3D, almost double that.”

What’s Ripe for Conversion?

Not every title is ripe for conversion, and planning a piece of media to originate in multiple formats is not as simple as it may sound. It seems reasonable that, for new productions, one might design in a fulldome configuration so that a flat screen version could readily be extracted and then a second eye rendered for 3D, thereby maximizing the show’s potential reach. We asked some experienced special venue media producers to comment on the feasibility of such a model.

“Your start by asking, ‘where is this movie going to end up?’ and then you produce your animation for the highest resolution first,” said Mindi Lipschultz, a digital production pioneer who is now in the final stages of a bleeding-edge project for the 2010 world expo in Shanghai, which opens in April 2010. “You can plan for this and think in multiple outputs. In some situations it might be more practical to produce in two streams with an overlap of certain content.”

Sean MacLeod Phillips, a prolific cinematographer and director with many giant
screen titles to his credit, including Sea Monsters, pointed out some inherent conflicts between the formats.

“When shooting 3D you don’t want extremely high contrast. When shooting for the dome, you do. The thing to do is consider your primary market first, make your production work the best there, and work backwards from that. The best you can do is to extract from a 1570 film capture. It would be different if we had 16k cameras or 8k cameras,” Phillips said.

These issues are most pronounced for live action, he noted, “In the case of animation or compositing, you have more flexibility: Pure animation lets you re-render.”

Producing original 3D immersive programming for the dome comes with its own unique set of technical issues. Don Pierce of Micoy explains, “Dual-lens cameras with spherical optics create ‘sweet-spot stereo,’ that is, stereo images which are correct at the front of the dome with the stereo effect dissipating towards the left and right side of the dome,” said Pierce.

Micoy has developed a patented rendering shader and a live-action camera design that provides correct stereo separation throughout the entire dome surface. Micoy is currently working with E&S as a display partner in the planetarium and science center market.

**Crossing over**

The developing fulldome/giant-screen market is far from homogeneous. A number of planetariums with fulldome theaters prefer to produce their own material, or opt for live presentations over syndicated or “canned” shows. It would be naïve for a distributor to automatically count every single digital dome as part of their territory.

“These are space theaters and they are mission-driven,” says Fraser. “What they book has to fit the expectations of their visitors. That said, they haven’t had these kinds of options before. I’ve spoken to quite a few planetarium directors who begin to wonder how rigid they really need to be. Some non-astronomy topics may resonate very well if they are good documentaries grounded in good science.”

Distributors must also consider show length. Some operators can’t accept a 40-minute running time, which is the standard length of a giant-screen documentary, because it won’t fit their throughput needs in the smaller dome theaters, or with school groups that have to keep to a schedule.

One of the most compelling drivers of the convergence is the need for dome-specific content, especially on the part of the existing film domes.

If we put aside idiosyncrasies for a moment and visualize a single community of dome theaters encompassing all digital domes over 20 feet in diameter as well as all giant screen film domes, we can perceive a community with considerable group purchasing power—a power that includes the ability to control content as a primary market.

For film dome operators, a larger, unified dome network would bring new viability and a brighter future to a situation that has for some years frustrated them: a dwindling of available content, exacerbated by the growth of flat screen 3D.

“Filmmakers haven’t been creatively planning their films with fulldome in mind, especially when producing for flat screen 3D,” says Fraser. “But I expect this will change.”

**It’s Inevitable**

“Convergence is not only possible, but inevitable, for giant domes,” says Jeffrey Kirsch, PhD, executive director of the Reuben H. Fleet Science Center, which houses the first permanent 1570 film dome theater. “I don’t think the content needs to be homogenized. There will be a continued call for astronomy content as well as science oriented productions, and they will be designed for domes. The planetarium groups have kept this criterion intact, showing the way to the future for those of us like myself who cut our teeth on Imax domes and Omnimax type films. We need high contrast in domes and it is not favored for many 3D shots.”

A past president of GSCA, Kirsch has been working to organize film dome theaters, particularly the larger ones most in need of compelling content. The Giant Dome Theater Consortium meets under the umbrella of GSCA and sees digital technology as a potential tool of revitalization that can not only improve the supply of content but also restore the place of dome theaters in the public eye as destinations for unique out-of-home experiences.

Producers wanting to serve this market can take cues from some of the older giant screen films which, says Kirsch, “are better composed for the dome as a rule.” He named a few specific titles: MacGillivray Freeman Films’ Adventures in Wild California (2000), Coral Reef Adventure (2003), and To the Limit (1989), and Howard Hall’s underwater films (Into the Deep, Deep Sea 3D and others), as “excellent examples of visually engaging the audience and getting them involved in the action on the screen.”

**Next steps in the convergence**

“The big problem I see right now,” says Kirsch, “is convincing my colleagues and their museum boards that they have got to be pro-”

(Continues on Page 57)
4th FullDome Festival
May 4 to 8, 2010
Zeiss Planetarium Jena

Watch and assess new shows.
Gather with professionals and new talents.
Join creative minds.

Friday, May 7, 2010
IMERSA.org Public Forum
(Immersive Media Entertainment, Research, Science & Art)
Celebrating and promoting immersive digital experiences.

Tuesday, May 4 till Thursday, May 6, 2010
FullDome Feature Shows
Full-length feature shows - 25 shows in total!

Friday, May 7, 2010
FullDome Students' Night
Contributions exclusively from students enrolled at universities inside and outside Germany.

Saturday, May 8, 2010
FullDome Festival Gala
This event will present outstanding student contributions and clips from all areas of the fulldome medium as shortlisted by the jury, as well as the prizewinning full-length feature show.
Carl Zeiss will present FullDome Awards to the best student entries: Creative and Performance Awards as conferred by the jury, and the Audience Award as decided by spectators' ballot.

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www.planetarium-jena.de
www.zeiss.de/planetariums

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We make it visible.
Waning Gibbous

What follows is a collection of interesting information and news about planetarians I have collected over the past three months. Normally this would appear in Gibbous Gazette, ably written by James Hughes for a number of years.

James, however, has joined the list of former planetarians, after being let go by the Carnegie Science Center in Pittsburgh, Pennsylvania. Show producer for the Buhl Planetarium for many years, he was most recently involved with Shawn Laatsch in the planetarium program Two Small Pieces of Glass.

It would be remiss of me not to include the fact that Joe DeRocher, a 28-year employee of the Cleveland (Ohio) Museum of Natural History, also lost his job recently. He and Roy Kaelin, who had recently moved to Cleveland from the Adler Planetarium in Chicago, were both the victims of budget cuts at the museum.

The list of contributions to the planetarium field and to IPS, MAPS, and GLPA from these three gentlemen would take much more space than this page has to mention. We feel for their loss personally and professionally.

If anyone would like to volunteer to continue compiling interesting bits of news of and about domes and the people under them, please contact me. -Sharon Shanks, editor

Lectures on the go

The web site of the Astronomical Society of the Pacific now provides two different series of podcasts involving interviews with and talks by leading astronomers.

Now you can listen to planet-hunter Geoff Marcy’s lecture while on the way to work, have lunch with Frank Drake, the father of the experimental search for extra-terrestrial intelligence, and learn about astrobiologist Lynn Rothschild’s search for Earthly extremophiles on the way home, all in the same day (and all free).

First is the Silicon Valley Astronomy Lectures, which features complete talks by noted astronomers. You can find the audio podcasts, and instructions for getting to the video versions at www.astrosociety.org/education/podcast.

The second is “Astronomy Behind the Headlines,” which features short interviews that give you a look at the latest discoveries in astronomy and space science and provide links to related resources and activities. It is particularly designed for the staff of science museums, planetariums, and nature centers, but can be enjoyed by educators in all settings and everyone who follows astronomy.

To listen to the latest episode, which takes a look at the black hole at the center of the Milky Way, to access related resources and/or to subscribe via iTunes or XML, go to www.astrosociety.org/abh.

New editor for AER

The Astronomy Education Review (AER), the journal of astronomy and space science education and outreach, has a new editor-in-chief: Dr. Thomas Hockey, professor of Astronomy in the Department of Earth Science at the University of Northern Iowa.

Hockey, who has been managing editor of the journal Archaeoastronomy, takes over from Sidney Wolff, former director of the National Optical Astronomy Observatory, who founded the journal together with Andrew Fraknoi of Foothill College, Los Altos, California. Wolff is retiring; Fraknoi will remain as the senior editorial advisor.

The on-line journal, now hosted by the American Astronomical Society, can be read at aeraip.org and will remain free for contributors and subscribers.


Speaking of the AAS:

The society has recently created a new membership category, Education Affiliate, which is open to persons professionally engaged in astronomy-related education and public outreach and whose principal employment is at community colleges, elementary and secondary schools, science centers, museums, planetariums, or agencies (e.g. National Park Service, Girl Scouts of America).

The Education Affiliate category provides reduced membership dues and conference registrations, an opportunity to present papers at AAS meetings, access to results of current scientific research, and subscription to AAS Newsletter and Spark: The Education Newsler.

Dues are $69. More details and an application can be found at www.aas.org/membership/classes.php.

About People

Robin Symonds announced recently that he is leaving his job as director of the Charles Hayden Planetarium at the Museum of Science in Boston, Massachusetts, effective January 27.

He wrote “It may seem like a strange time for me to leave, since, as many of you know, we just closed down for a big one-year renovation, and we’re finally getting full-dome. However, I’m a tad burnt out and decided that the beginning of the renovation was a good time for both me and the museum to make a transition.”

Adam Thanz at Bays Mountain Planetarium in Kingsport, Tennessee, shared that an Emmy has been awarded for the work by Woodrow Grizzle III and others relating to video broadcasts about four topics in science. The Emmy was awarded from The Suncoast Chapter of the National Academy of Television Arts & Sciences. Grizzle started his planetarium career at Bays Mountain Planetarium, moving later to be the planetarium director at the South Florida Science Museum.

Arthur W. Gielow, 40-year director of the Whitworth Ferguson Planetarium at Buffalo State College (State University of New York), ended a long battle with brain cancer on January 30, 2010. He was 62.

Memorials can be made to Gilda’s Club of WNY, 1140 Delaware Ave., Buffalo, New York 14209 or the Art Gielow Memorial Fund at Buffalo State College Foundation, c/o Earth Science Department, 1300 Elmwood Ave., Buffalo, New York 14222.

Take part in a national event

The USA Science & Engineering Festival will be the country’s first national science festival when it descends on the National Mall in Washington, DC October 23-24.

The festival is billing itself as the “ultimate multi-cultural, multi-generational and multi-disciplinary celebration of science in the United States.” They expect more than 500 science and engineering organizations to take part.

You can sign up to host an expo exhibit in Washington, or you can host a satellite event in your own area and tie it to the national event. More information is available at usa-sciencefestival.org.

Rumors? Or Reality?

Surfing the web, I came across an item saying that the Moscow government has announced that the Moscow Planetarium would be open for to public again in December 2010, undergoing renovations that would make it “the largest facility of the kind in the world.” It will be interesting to receive more news from our colleagues in Moscow about these plans.
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In spite of global warming, there have been three very cold January weeks in mid-Sweden. But it is important to distinguish between weather and climate, so I don’t believe a new ice age suddenly is on its way. Hopefully the Gulf Stream hasn’t changed its pattern and anyway, the last few days have been rather mild, just a few centigrade degrees below zero.

The International News column relies on contributions from IPS Affiliate Associations all over the world. Many thanks to Agnès Ackerman, Vadim Belov, Bart Benjamin, Ignacio Castro, Alexandre Cherman, Kevin Conod, Alex Delivorias, Jack Dunn, Martin George, Chris Janssen, Loris Ramponi, and Alexander Serber for your contributions to this column.

Upcoming deadlines are 1 April for Planetarian 2/2010 and 1 July for 3/2010. Anyone who wants to contribute news from parts of the world where IPS has no association (see page 3) is welcome to send it to Martin George, martingeorge3@hotmail.com.

Association of Brazilian Planetariums

The digital wave keeps sweeping Brazil! In March, 2009, there were only two digital planetariums available to the public (Rio de Janeiro and Feira de Santana), with another one installed, but not yet opened, and the special case of the Navy Academy, which was fully functional, but not for the general public.

Now, March 2010, this number has doubled, with four digital domes. Opened in the last year are Florianópolis, a Digistar3, and Aracaju, with a SkySkan system. And the numbers will keep going up, since the Belo Horizonte Planetarium and the Sabina Center Planetarium, in Santo André, a suburb of São Paulo, will open soon.

There is also the very special case of Ceará, a beautiful state in the northeast region of Brazil. The capital of Ceará Fortaleza (“fortress” in Portuguese) has one of the busiest planetariums in Brazil, the Rubens de Azevedo Planetarium, part of the Centro Dragão do Mar de Arte e Cultura (Sea Dragon Center for Arts and Culture). And for its great services to the community, the state government has rewarded the Sea Dragon with brand new equipment: a Carl Zeiss ZKP4 with SpaceGate Quinto, running PowerDome and the Uniview software!

The current projector, a Carl Zeiss ZKP3, will be upgraded with the SpaceGate Quinto hardware and will be relocated to the city of Sobral, in the countryside. Sobral is not unfamiliar for those who love the history of science. It was one of the two sites that hosted expeditions, back in 1919, to confirm Einstein’s general relativity.

Most people quote the expedition to the island of Principe, in the West coast of Africa, because it was led by Arthur Eddington himself, but the data acquired in Sobral were much more accurate and reliable.

Association of Dutch-Speaking Planetariums

On 29 November, the Europlanetarium in Genk, Belgium, had the “Last Light” from the Zeiss RFP III opto-mechanical planetarium projector. Some 19 years after its inauguration the projector was given an honorable place in one of the exhibition rooms. On 1 December, the demolition of the projection dome and everything inside it started. Once all was removed the new installation could start.

It is strange to stand in an empty planetarium dome and at the same time it is nice to see that it all works out according to plan. Starting 4 January, Spitz installed a Nanoseam dome. By 25 January, Evans & Sutherland installed a Digistar 4 SP2HD system under the dome. Jezet Seating installed 110 new seats (two bus loads of audience) with different inclinations for the best view possible.

The firm Bis and Play has installed a new sound system so that the audience can enjoy the 5.1 sound from the Digistar 4 the way it should be. The Europlanetarium staff has also implemented a multilanguage system that allows showing a film in four different languages simultaneously. An automation system takes care of all the tasks like closing doors, dimming the lights and so on. The dome is lit by lights from Bowen Technovation, who has installed an LED light system around the dome, a huge change from the previous center lights with the Zeiss RFP III.

Starting in February 2010 staff implemented the “school” planetarium shows that are
written with the curriculum in mind. With all this new technology and the extended mandate as one of the gateways to the Nationaal Park Hoge Kempen in mind, a new name for the Planetarium Dome is looked for.

The new planetarium dome was opened on 5 March with an open house weekend, so that everybody could see what happened during the months that the planetarium was closed.

Association of French-Speaking Planetariums

The 26th AFP Conference will be hosted 13-16 May 2010 in Dijon, main city of the beautiful Bourgogne region with its legendary wines. A rich program is proposed by the Jardin des Sciences (www.dijon.fr/fiche/le-jardin-des-sciences-museum-planetarium-jardin-botanique.dos.33.php). You may find more information by contacting Lydie Jobert at ljobert@ville-dijon.fr or Laurence Demond at aplf@astro.u-strasbg.fr.

*Galaktos: A Tour of the Milky Way* is the 19th production of Astronef, Planétarium de Saint-Etienne. This planetarium show deals with the Milky Way as a galaxy, describing its main characteristics and its content of stars and interstellar matter, as well as the central black hole.

Released in late 2008, it is aimed at all the members of the family with a special attention to the children. This is why the screenplay is based on an entertaining story that features robots travelling within the galaxy.

A new project is emerging in Saint-Omer. A former limestone quarry was turned into a V-2 rocket launch site by the Germans during the second world war and called La Coupole. Nearly 120,000 visitors see the underground complex of La Coupole and the nearby blockhouse at Éperlecques each year. A digital planetarium will be created as a scientific complement to lead visitors to understand the importance of research in astronomy for the development and preservation of our society.

The 3rd meeting for small planetariums was held in Marseille on 21 December 2009. Organized because of the strong demand of those who attended the December 2008 and May 2009 meetings, it allowed watching, in world exclusivity, the Nightshade project for planetariums (www.nightshadesoftware.org).

Nightshade is based on Stellarium and adapted to the needs of planetarians by Rob Spearman from Digitalis Education, Lionel Ruiz from LSS Project, and mathematics and cybernetics faculty from Nizhny Novgorod State University. The meeting was a breathless one-day long race to show new techniques, script course, video-making, and fulldome shows (*Earth’s Run, Two Small Pieces of Glass, ALMA show*) and previews.

Association of Italian Planetaria

The “Ignazio Danti” Planetarium in Perugia, annexed to the Istituto Tecnico Industriale A. Volta, organized a special event on December 21. The AIDP (Italian Association of Directors of Personnel) Umbria Associates requested a performance, a Christmas event titled “We Are Children of the Stars,” to recognize “new stars” in the company.

The initiative resulted in a real “star trip” of the business reality of everyday life through a parallel between stars and constellations and people within organizations. The program was conducted by Simonetta Ercoli, coordinator of activities for the planetarium and a member of the National Association of Teachers of Natural Science; and Paolo Vergnani, an actor and psychologist specializing in the search for new modes of formation.

The performance was divided into four parts: the sun, our star for orienting the day with its diurnal path; the leader in organizations and the evolution of theories of leader-
ship; the night sky with stars and constellations for orienting the night; and guidance, change and culture.

The Planetarium and Observatory Don Paolo Chiavacci of Crespano del Grappa is a few kilometers from Padua, Possagno and Asolo. In 2009, the planetarium received visits from approximately 6000 first and second grade students and almost 1000 persons in programs open to the public free of charge. They have held three exhibitions of sundials and astronomy, including one in the prestigious Villa in Maser by Andrea Palladio. These events were attended by more than 6000 visitors.

Twenty-five events and at least one exhibition are planned for the public in 2010. A new astronomical observatory will be added, located on a large terrace near the dome with a 500 mm (20 inch) reflector, which will allow the view of the entire horizon. They will add three telescopes, including a 236mm (9 in) refractor connected to the planetarium. For more information, see www.specolachiavacci.it.

Association of Mexican Planetariums

On November 27-28, the XXXVIII Association of Mexican Planetariums Meeting took place at the Luis E. Erro Planetarium and Education facilities, part of the National Polytechnic Institute (IPN) in Mexico City.

AMP Meeting delegates thank their most diligent host, Jesús Mendoza Álvarez, planetarium sub-director, Sergio Viñals Padilla, director of the science center, and dedicated staff who made them feel right at home through their kind hospitality and willingness to organize the AMP Meeting after a last-minute change of venue. The change was made less than two months after former AMP President Antonio Sanchez Ibarra passed away and it became impossible to hold the meeting in Sonora, as originally planned.

IPN’s Educational Services Secretary Dr. Héctor Leoncio Martínez Castuera offered the welcoming remarks. There were 18 planetariums represented from all over Mexico with portable, intermediate and large domes. Many relevant papers were presented.

There has recently been an increase in the number of digital projectors used in Mexico, setting a new phase for exchange of ideas, original program contents, and collaboration among planetariums, such as the fulldome digital show Tales of the Maya Skies. This program, produced by the Chabot Space Science Center & Planetarium in Oakland, California, USA, is being shown at the Luis E. Erro Planetarium.

Main lectures were given by Dr. Isaura Fuentes on Astronomy Recreational Workshops in France and Germany, and by Sergio Viñals Padilla, on Internet II CUDI system, proposing collaboration on planetarium diffusion as part of the Corporación Universitaria para el Desarrollo de Internet (University Corporation for the Development of Internet) Network. A few vendors participated as well; Ecosystemas, Kosmos, Victorinox, Uniview, and the web page Cosmowiki, the astronomical link.

The election of officers took place for the period 2010-2012: President Eduardo Hernández, Planetario Torreon; President Elect Jorge Sanchez, Planetario Pachuca; Secretary Juan Jose Fernandez, Planetario SNTE San Luis Potosí; and Treasurer Juan Jose Duran, Planetario Merida.

The AMP 2010 meeting will coincide with the AMP 30-year anniversary and will be at the San Luis Potosí Planetarium, which is celebrating its 25th anniversary. Dates are still to be scheduled, but probably will be October or December. It is worth mentioning that this planetarium was created through AMP lobbying in 1994, when an annular solar eclipse crossed the San Luis Potosí State.

Canadian Association of Science Centres

The TELUS World of Science in Calgary had a great year for astronomy programming, all under the International Year of Astronomy banner. By the end of 2009, about 110,000 people had taken in astronomy programs, including planetarium shows such as Galileo Live! (which made up just a portion of the schedule in the Discovery Dome theater), traveling astronomy exhibits, and a busy calendar of some 200 outreach events such as science cafés, lectures, public star nights, and activity booths at many local festivals.

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The science centre partnered with the Royal Astronomical Society of Canada, Calgary Centre, and with the University of Calgary’s Rothney Astrophysical Observatory to present many of the year’s events.

The partners set up a common website (www.astronomycalgary.com) to promote all public astronomy programs in the city, a site which will continue in 2010 as a legacy of IYA09. A Facebook group, a Flickr site, and a Twitter feed also helped promote local IYA events.

Meanwhile, construction has begun on a new science center that will feature, among other attractions, a new tilt-dome theater for immersive digital presentations of all kinds. Contact: Alan Dyer, alandyer@telusplanet.net.

During IYA09, the Montreal Planetarium was very busy with show production, star parties, lectures, exhibits, etc. All in all, they reached out to over 400,000 people throughout Quebec, with the help of other science museums and numerous amateur astronomers in all corners of the province. The presentation of Moi, Galilée, the French version of the nationally-produced show Galileo Live! was very well received by several thousand spectators. A survey of the audience showed that people were thrilled by the theatrical aspect of having a live comedian portray Galileo.

In parallel with all their outreach efforts, work on the design of the new Montreal Planetarium continues on schedule. In 2010, final touches will be made to the building’s architectural design and, come the fall, construction will begin at the site of Montreal’s Olympic park, near the Montréal Biodome, Botanical Garden, and Insectarium. Contact: Pierre Chastenay, chastenay@astro.umontreal.ca.

**European/Mediterranean Planetarium Association**

On 7 December 2009, the Eugenides Foundation presented to the Athenian public the abstract sculpture Genesis, created by internationally-acclaimed artist Kostas Varotsos. The sculpture, consisting of numerous glass stones hanging from the high ceiling of the Foundation’s main entrance, depicts the last stages of formation of a planetary system, when clumps of matter in the protoplanetary disk around the protostar become steadily larger and powerful jets of gas emanate from the young star within.

Genesis was especially created for the Eugenides Foundation and is a fitting close to the celebrations of the International Year of Astronomy 2009.

The Eugenides Planetarium, in order to honor Varotsos and his work, produced Utopia, a special 7-minute planetarium show directed by Panagiotis Simopoulos, which presented a colorful animation of some of the most important works of the artist. The show was received enthusiastically by the 278 invited guests.


**Great Lakes Planetarium Association**

Iliinois. The Strickler Planetarium at Olivet Nazarene University in Bourbonnais has entered an agreement with the campus’ art department, thereby taking another step to integrate planetarium usage into non-astronomy departments.

The William M. Staerkel Planetarium at Parkland College in Champaign as closed in January for renovation and re-opened in February. In early 2010, they will host a World of Science Lecture Series featuring the Large Hadron Collider and decoding the genome of the cow.

The Lakeview Museum of Arts and Sciences Planetarium in Peoria has just started an after-school program at Harrison School in Peoria. The 100 students involved will come to the planetarium for six hours of activities.

Using funds received through an Institute of Museum and Library Services grant, the Cernan Earth and Space Center at Triton College will soon begin the long process of converting its slide-based programs to digital, three-screen versions.

**Indiana.** Pike High School Planetarium in November was a part of the nation-wide unveiling of a mural-sized image of the Milky Way imaged by the Hubble Space Telescope, Spitzer Space Telescope, and Chandra X-Ray Observatory.

The Evansville Museum’s Koch Planetarium recently completed the third year of its National Science Foundation-funded project Outreach to Space. The four-year project, which takes hands-on space and astronomy exhibits to fairs, festivals, and service organizations, was delivered to 7,620 mainly rural guests in 2009.

The E.C. Schouwelier Memorial Planetarium at the University of Saint Francis in Fort Wayne welcomed the arrival of a new CRT video projector and Bowen Technovation’s AstroFx Media Manager video system. The planetarium’s foyer is now equipped with a 52-inch flat panel screen for the Space Telescope Science Institute’s ViewSpace astromy news service.

**Michigan.** The Kingman Museum in Battle Creek is well on its way to becoming the New Kingman Museum. Planetarium construction was completed last fall and construction on the upper level of the museum is currently underway.

The Dassault Systèmes Planetarium in Detroit concluded IYA with several events. The first was the presentation “Why Does The Vatican Need An Astronomer” by Brother Guy Consolmagno, curator of the Vatican Meteorite Collection and member of the Jesuit Brotherhood. They also offered a workshop for families named Build Your Own Holiday Telescope, which featured the IYA’s Galileoscope refractor kit.

The Roger B. Chaffee Planetarium in Grand Rapids recently premiered a new original production, Discover Your Universe, which accompanied the Grand Rapids Public Museum’s exhibit Leonardo da Vinci: Machines in Motion. With help from the local astronomy club and universities, their Harvest Moon Watch event gave roughly 3,000 people the opportunity to view the moon and Jupiter through sidewalk telescopes scattered throughout Grand Rapids.

**Ohio.** Scott Oldfield reports that in October, the Smith Middle School Planetarium in Vandalia host Vandalia’s other middle school for a review of fifth grade universe standards. They also hosted a special show for faculty and staff.

Marietta College’s Anderson Hancock Planetarium welcomed over 5,500 visitors in the six months since its dedication and opening. This number is particularly impressive when
coulped with the fact that the city of Marietta only has 15,000 residents and is located in a rural area.

At Bowling Green State University, the BGSU Planetarium has been running Hubble Fest 2009, which features encore runs of the four space telescope shows it has run over the years. These were followed by BGSU’s Christmas show Secret of the Star, which made its twentieth annual seasonal run this year.

Wisconsin/Minnesota. The Soref Planetarium at the Milwaukee Public Museum had a very successful opening with its new Galileo: The Power of the Telescope show. They are also working on Houston’s Secrets of the Dead Sea planetarium show for a companion exhibit.

On 7 October, the Minnesota Planetarium Society was one of the partners in a domecast with their companion NASA GeoDome from the front lawn of the White House, which was held as part of the White House Star Party IYA Celebration. The audience was 150 primarily middle school children from the Washington DC area. The Obama First Family toured the various demonstrations and the Secret Service even directed them into one of the two domes.

The University of Wisconsin-Eau Claire’s L.E. Phillips Planetarium has stopped presenting shows for community groups and school field trips for the year due to reduced funding from the Wisconsin legislature. Their director now presents public shows on Tuesday evenings and Saturday mornings, but with no show development or group shows.

Under the direction of Ken Murphy, the planetarium at Southwest Minnesota State University in Marshall has undergone extensive renovations, with new carpet, chairs, sound system, and refurbishment of its Spitz 512, Elumenati/Uniview, and Skylase systems.

The Mankato (Minnesota) East High School Planetarium was invited by NASA to be one of three planetariums to attend the White House Star Party. The planetarium was also recently involved in a presentation in Ghana, West Africa.

The UW-Milwaukee’s Manfred Olson Planetarium celebrated the winter solstice with a special program focusing on winter constellations. Another special show, titled Astronomy Beyond 2009, wrapped up their celebration of IYA in January.

The Minnesota State-Moorhead Planetarium hosted a successful IYA 2009 event in October titled If Galileo Could See Jupiter Today.
STARS

THE OTHER SIDE OF INFINITY
BLACK HOLES

THE BEST in Fulldome Programming
astronaut Clayton Anderson to be the host for the concert and spent eight months working on video to accompany each of the pieces of music in the concert.

Also during IYA, Space Grant helped support the speakers for the Nebraska Star Party and Dunn was awarded a mini-grant to develop a traveling display of astrophotography by amateurs.

Space Grant also allowed Jet Propulsion Laboratory Engineer Nagin Cox to speak at both King Planetarium and University of Nebraska-Lincoln, hosted by Mueller Planetarium.

Nagin also spoke at Creighton University in Omaha. At UNL, Nagin’s visit was also sponsored by the Society of Women in Engineering.

This fall several planetariums participated in the unveiling of new images from Hubble, Spitzer and Chandra of the center of the Milky Way galaxy. Mueller Planetarium in Lincoln, Leninghoener Planetarium at Midland College, Fremont, Nebraska, and King Planetarium in Omaha all held unveiling events.

**Middle Atlantic Planetarium Society**

Elections for the MAPS Board are currently underway. It should be a lively election as there are several candidates running for the three spots open on the Board. Candidates include Lee Ann Hennig, Steve Innes, Paul Krupinski, Mike Smith, Steven L.J. Russo and Theodore T. Williams. The winners of this election will take office after the business meeting at the annual MAPS Conference.

MAPS has established a MAPS Fellow Award. The purpose of the award is to recognize those members of the organization who maintain an active membership status of a minimum of 7 consecutive years and at least one of the following criteria: held an elective office or served on the MAPS Board; served as a conference host; provided significant service to MAPS; and/or made a significant contribution to planetarium methodology, technology, or education.

A MAPS member can nominate another member or herself/himself for the award by completing the MAPS Fellow Award Nomination Form and submitting it to the MAPS Awards Committee Chair. After review by the MAPS Board, those nominees completing the requirements will be given the award at the Middle Atlantic Planetarium Society Annual Conference. Details and an application form are available on the MAPS website.

In recognition of the 400th anniversary of Galileo’s first celestial observations and IYA 2009, NASA’s Great Observatories—the Hubble Space Telescope, Spitzer Space Telescope, and Chandra X-Ray Observatory—collaborated to produce another spectacular multiwave-length view of our universe. Many planetariums in the MAPS region participated in the national unveiling and display.

**Nordic Planetarium Association**

A major event of the International Astronomy Year in Sweden was the temporary Galileo Galilei exhibition at the Nobel Museum in Stockholm, 9 October 2009 to 17 January 2010. The single most exciting exhibit contained one of the two surviving telescopes that were built by Galilei.

Lars Broman got the chance to visit the museum and take a photo of this rare piece. He found it more interesting than the exhibit containing one of Galilei’s fingers that he took a photo of in the Museum of Natural History in Florence two years ago.

The exhibition also included *Sidereus Nuncius* (*Sidereal Messenger*) as well as realistic facsimiles of the sheets of papers with Galilei’s original drawings of Jupiter with moons and our own moon with craters.

**Russian Planetarium Association**

In addition to lectures and shows, Russian planetariums delivered a lot of other events dedicated to the International Year of Astronomy, such as conferences, scientific lectures, meetings with leading Russian astrophysicists, public astronomical observations, and astronomical contests, schoolchildren Olympiads, competitions, and even exhibitions of children paintings, rhymes, and design art works on astronomical topics.

Marina Kazantseva, director of Lytkarino Planetarium (Moscow Region), arranged an excursion to the Lytkarino Optical Glass Plant for children from the Amateur Astronomer Club. Young astronomers expressed great interest with the Large Mirror Production Facility. At present, a 4-m (12-ft) mirror is being processed. It will be mounted in the largest Asian telescope to be put into operation in India.

It was also interesting to see the process of shaping the 6-m duplicate mirror for the Russian BTA telescope located at the North Caucasus. This mirror is being upgraded at the Lytkarino Plant.

Anatoly Denisov, director of Ufa Planetarium (Bashkortostan), delivered an astron-
omy and cosmonautics news block within the framework of the local radio digest “Light from Remote Planets,” broadcasted Monday to Friday in February-March 2009.

Employees of the Ufa Planetarium participated in many local TV programs, newspaper interviews, and internet sites, offering information on the planetarium activities and astronomy news.

The planetarium and Bashkortostan residents participated in the 23 March event organized by the International Dark Sky Association aimed at estimating light pollution, and on 26 March, joined the Day of the Earth event.

An All-Russia Conference New Astronomy Teaching Techniques was organized by research institutes, universities, and the Nizhny Novgorod Planetarium, held 23-25 November 2009 at the Nizhny Novgorod Pedagogical University. A report on Russian digital planetariums in Russia and worldwide was delivered by Zinaida Sitkova.

A public lecture, “The Radio Sky,” was delivered at the Nizhny Novgorod Planetarium by Prof. Anatoly Zasov from the Sternberg Astronomical Institute of the Moscow State University.

The assembly concluding IYA2009 events in Nizhny Novgorod was held 18-19 December at the Nizhny Novgorod Planetarium and united all who made the IYA in the city and region substantial, interesting, and memorable. Winners of the astronomical contest devoted to the 100th anniversary of the famous Soviet astronomer Boris Kukarkin, who was born in Nizhny Novgorod, were honored.

The assembly was attended by the Russian cosmonaut Sergey Treschev, and S.I.Levshakov, a leading scientist from the Lofe Physico-Technical Institute in St Petersburg, told amateur astronomers and the public about his work at the European Southern Observatory.

The Scientific and Practical Conference Planetariums in the XXI century was held 28-29 October 2009 at the St Petersburg Planetarium and was devoted to the planetarium's 50th anniversary.

A special feature was a visit to the Petropavlovsk fortress, where, in a century-old tradition, a gunshot announces noon for the city. Mikhail Belov, director of the St Petersburg Planetarium, at one time performed the role of the gunman.

A visit to the Pulkovo Observatory was scheduled in the evening. Its main building is a museum now. It hosts a bronze sign through which the Pulkovo Meridian passes. The meridian point marks the origin of the Russian geodetic and geographic system.

Visitors from Nizhny Novgorod were welcomed at the Planet company. This is the first Russian company to produce and supply mobile digital planetariums to customers in Russia and CIS countries. The company has already delivered such facilities to a few Russian regions, as well as to Almaty in Kazakhstan and Lugansk in Ukraine.

The Planet company was accepted to the Russian Planetarium Association as a member responsible for establishing cooperation among Russian mobile digital planetariums.

Zinaida Sitkova and Vadim Belov also visited the Tranzas group of companies at St Petersburg. The Tranzas group has great experience in professional simulator production. Over 4800 simulator systems produced by this group were purchased and put into operation at training centers in 73 countries worldwide.

The Tranzas group expressed interest in producing fulldome digital shows for planetariums. The first Russian mobile digital planetarium opened on 22 July 2009 at school No. 29 in Podol'sk (Moscow Region). The opening was coincided with the solar eclipse. It was demonstrated how this solar eclipse looked at various cities of the Earth and even from the lunar surface.

The president of the Russian Planetarium Association was elected in June 2009. All the votes were given to Anatoly Cherepaschuk, director of the Sternberg Astronomical Institute of the Moscow State University, Laureate of the 2009 Russian State Prize. Former pilot-cosmonaut Georgy Grechko remains emeritus president.
Firstly, I am pleased to report on a visit that I made to Hong Kong and Macau in November to take a look at the new system in Hong Kong and the progress toward the opening of the new planetarium at the Macao Science Centre.

Arriving at the Hong Kong Space Museum, I was delighted to meet up once again with Mr. Chan Ki-hung, who was pleased to be able to show me the new 8K digital system there. As so often happens on my travels, I had been there only a few minutes when Steve Savage of Sky-Skan emerged from the cove to say hello! It’s quite remarkable how often we meet in different parts of the world.

The 8K Sky-Skan system was most impressive, and the planetarium has clearly come a long way since my previous visit there in late 2007. It’s always great to see our Hong Kong planetarium colleagues and, of course, to see a planetarium that is doing so well.

My visit to the planetarium, however, was not all! After our time there, Ki-hung drove me to two special locations of great astronomical interest run by the Hong Kong Space Museum in the New Territories.

First, a little geography. The New Territories are in the northern part of Hong Kong, and are called “new” because they were the subject of the famous agreement that leased that part of the Chinese mainland to Britain—which much earlier had been ceded Hong Kong Island and the Kowloon Peninsula in perpetuity by the Chinese—for 99 years, starting in 1898. When the lease ended in 1997, all of Hong Kong, including the parts originally ceded, was returned to China.

Back to astronomy! We first visited a site called Astronomy Park at Sai Kung, which was in preparation and due to formally open on 2010 January 30. It is a wonderful facility with an open-air planetarium, several replicas of ancient astronomical instruments, and even some beautifully-designed tilted (and quite comfortable) observing benches on which visitors can relax and learn about the sights of the night sky overhead.

The planetarium, with its 7-m dome, is a great idea. It will be used with a Homestar projector and on clear nights, the “real thing” is only a few steps away, so that the planetarium sky can be compared with the actual night sky quite easily.

Our other stop that day was at the Lady Maclehose Holiday Village near Sai Kung, where the Hong Kong Space Museum runs an observatory with a 24-inch Cassegrain telescope. This, too, is a wonderful educational facility and includes areas for presentations.

Great Progress in Macao

Next I traveled on to Macao, where I paid a memorable visit to the Planetarium and Science Centre and was delighted to see the great progress since my previous visit.

The Macao Science Centre and Planetarium has been a major project for Macau, and the imposing facility is visible for quite some distance around. It occupies an area of land adjacent to the water but not far from the central hub of Macao activity.

I was met by Mr. Chee-Kuen Yip, Joei Leong and Steven Ngai, and it was great to see them all again. Steven led me on a tour of the complex, starting, of course, with the planetarium. At the time of my visit, the planetarium, with its 3D system, 15-m dome and 135 seats, was nearly complete. Once again, there was Steve Savage, working hard in preparation for the opening. I found him in a side room meticulously adjusting one of the Sony SRX-T110 projectors that will be in use in the facility.

The Science Centre is a large complex with many rooms for science exhibits. Although the exhibits were not completed when I made my visit in November, I was impressed with the progress.

I am delighted to report that the Science Centre and Planetarium were formally opened on Saturday, 19 December, by President Hu Jintao. The significance of that date was that it was the eve of the tenth anniversa-
The official opening date for the public had not yet been announced, but I am sure that this will have taken place by the time you read this issue of the Planetarian.

**Planetariums in the Middle East**

Now, to other news. I have continued my discussions with both Chris Philips and Marc Rouleau regarding the planetarium situation in the middle east. You may recall that Chris is very keen on the idea of setting up a planetarium in Gaza, and has been in touch with me recently with regard to the possibility of a planetarium becoming established in northern Iraq. These are exciting possibilities!

Chris and I are still discussing the funding situation, as we all do when attempting to establish a new facility. While, of course, the IPS is not in a position to provide this kind of financial support, I am keen to support Chris in whatever way I can.

Marc Rouleau has taken a good deal of interest in planetariums in the Arab-speaking world, especially because the next IPS conference, of course, will be held in Egypt. Marc has been wondering about the possibility of working toward setting up an Arabic-speaking affiliate group and I have been working with him in these initial discussions. I am hoping that several representatives from planetariums within the region are present in Alexandria.

Marc writes:

“In the In Front of the Console section of the December 2009 *Planetarian*, Sharon Shanks asked “Did you know there was a planetarium in Dubai?” I know there are several planetariums in Dubai and nearby Sharjah—I live and work there now.

“Dubai is a fast growing city of over two million people. It is well known for its great engineering projects: the Burj Dubai (the tallest building/structure ever constructed on Earth), the Burj Al Arab (that’s the sailboat-shaped hotel), the Palm Islands and World Islands (built from scratch out of the sea), and even Ski Dubai (an indoor ski hill at one of the malls).

“Planetariums in Dubai are relatively new, but there are three of them. The planetarium at Children’s City was installed in 2001 with a Spitz 1024, but was updated in 2008 with a Global Immersion fulldome system. An SP2 HD from Evans and Sutherland anchors the planetarium at the GEMS World Academy in Dubai (2007). A Digistar 3 system is listed for the planetarium at the Dubai Mall in the middle of the Gold Souk, but no programs are currently running there.

“In nearby Sharjah there are also three planetariums. The oldest planetarium in the country (which itself is only 38 years old) is a 7.3-m (24-ft) dome with a Minolta MS-8, installed in 1982, in the Al Khan neighbourhood in Sharjah. At the Sharjah Science Museum a similarly sized dome (1996) holds a Spitz A3P. My planetarium (2008) at the Sharjah Women’s College campus of the Higher Colleges of Technology is a 40-ft dome with a Spitz SciDome system.

“I have also learned of the existence of a portable planetarium system run by the Arab Youth Venture Foundation, based in Ras al-Khaimah, and another portable planetarium out of Abu Dhabi, making a total of eight planetariums in the country.

“One of my goals this year is to bring together the planetariums of the UAE, and potentially, of all the Arabic speaking countries. From the IPS world-wide directory there are around 35 planetariums in these countries, though some of the listings may be for facilities that no longer operate.”

As you can see, Marc is full of enthusiasm. The International Relations Committee looks forward to working with him!

**Preparing for India**

As I write this, I am preparing for a trip to India to visit some of our planetarium colleagues there. I’ll be stopping off in Delhi, where I shall be meeting up with Rathnasree Nandivada, and in Mumbai, where I shall meet with Piyush Pandey.

I’m looking forward to discussing with them, at length, the planetarium situation in India, and seeing their facilities.

While in India, I shall be visiting the Giant Metrewave Radio Telescope (the GMRT) near Pune, outside Mumbai. I look forward to reporting on my visit in the next issue of the *Planetarian*. 
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7th European Meeting of Small and Portable Planetaria

In my last column I told you that Ilpo Kuusela enjoyed the 6th European conference so much that he and Arto Oksanen of the Kallioplanetaario in Finland will host the next meeting. Well, here is their official invitation.

I hope to see you there!
Ilpo and Arto will be setting up a website with more information and instructions for registration at the end of March. You can contact them directly and indicate your interest. In April you can Google “7th European Meeting of Small and Portable Planetaria” to find the website.

Your Invitation:

“The world’s first planetarium built into the rock, Kallioplanetaario, invites all of you to the 7th European Meeting of Small and Portable Planetaria on the 17th-20th of July 2010 in Finland.

“Kallioplanetaario is located in Jyväskylä, in the middle of Central Finland’s beautiful nature, lakes and forests. The planetarium opened its doors in spring 2008 and immediately became a blockbuster success. The sheer scale of the excavation of the cave and the installment of modern presentation technologies into its depths was a slight miracle, but 60,000 visitors in the first year of operation, exceeded all expectations.

“The most thrilling place in the cave is the planetarium with E&S’s Digistar 3 SP2 and 50 comfortable seats under the 10-m negative-pressure dome. The dome is designed by Antti Jännes and it is a Finnish innovation, which in itself is worth a visit for anyone interested in planetariums. Inclined seating and the low hanging dome closes the viewer intimately to the immersive presentations.

“Planetarium programs include traditional star shows, fulldome movies and music shows. The latest novelty is combining the stars, the cave paintings and Kalevala, the national epic of Finland, into a theatrical performance under the dome. Another special feature is the astronomical activities for school children.

“The rock saunas bring an exotic spice to the cave, which offer a relaxing bath for guests and meeting attendees. A cafeteria and a restaurant are also available.

“The success story of Kallioplanetaario began in 1997, when the astronomical association Jyväskylän Siniusry built an observatory in the small village of Nyrölä. Active observing did bring good results, for example the first discovery of an asteroid by Finnish amateur astronomers. The asteroid was later named Nyrölä by the village. The dream of a planetarium was realized ten years later, after many interesting twists and turns.

“We welcome to visit Kallioplanetaario, enjoy the meeting program and spend time together with fellow planetarians!”

Best regards, Arto Oksanen (arto.oksanen@kallioplanetaario.fi) and Ilpo Kuusela (ilpo.kuusela@kallioplanetaario.fi)

Website: www.kallioplanetaario.fi

GeoDome in Copenhagen

Sweden’s Norrkoping Visualisation Centre brought their GeoDome to the Arctic, December 12-14, for interactive presentations of global climate data designed to support decision-making and public dialogue.

The global climate activist organization 350.org was at KlimaForum, December 15-18, using the GeoDome to explore human interaction with the environment and facilitate dialogue on solutions for a sustainable future.

The events are part of COP15, the 15th meeting of environment ministers who meet annually under the United Nations Framework Convention on Climate Change. The objective of this conference was to set the terms and targets for greenhouse gases in the atmosphere over the next several years.

“We’re excited and honored that the GeoDome enables our partners to communicate the big-picture context of these important issues,” said David McConville, co-founder of The Elumenati. “By illustrating the relationships between climate change and other interconnected global issues, both Norrkoping Visualization Centre and 350.org show the pressing need for visionary solutions that are comprehensive, systems-oriented, and interdisciplinary.”

Press Agent Hilary McVicker explained: “The GeoDome immersive learning environment is a uniquely effective tool for creating focused, inquiry-based learning experiences. Using the Unview software platform from SCISS AB, participants are able to interactively explore dramatic scientific visualizations from NASA, NOAA, and the American Museum of Natural History that demonstrate ecological principles at local, global, and cosmic scales. Information is presented in a systems-based context that makes complex concepts easy to understand while instilling a sense of wonder.”

For more information, visit www.geodome.

Our hosts explain, “The surrounding nature with lakes and forests is in itself very beautiful to experience and the clear seasonal variation brings its own spice to external activities.” Photo provided by Arto Oksanen and Ilpo Kuusela.
American in Italy Winner

Congratulations go to Michele Wistisen from the Casper Planetarium in Wyoming. She is the winner of the 2010 trip to Italy! We received several excellent applications. Michele's application, unique lesson and activities, resume and extensive experience as a planetarium educator made her the strongest candidate for the program.

Michele will receive money for air travel up to $1000. Her room and board and train travel will be paid for the entire stay.

Michele will arrive in Perugia on 16 April 2010 and present lessons there on the 17th. On the 18th she will attend the Italian national planetarium conference and then travel to Milan, where she will visit the Milan Planetario Ulrico Hoepli before traveling to Brescia. There she will present planetarium lessons during the mornings of the 20th to the 23rd and then travel to Farra d'Isonzo (www.ccaf.it).

She will spend two days as a tourist around Farra (Gorizia, Trieste, Aquileia, Cividale) and then teach planetarium lessons there from the 26th to the 28th. She will fly home on the 29th. I look forward to her report of all she experienced and learned on this fantastic adventure.

September 15 is the yearly deadline for the applicants of “A Week in Italy for an American Planetarium Operator.” This exciting opportunity has been offered since 1995 and we are grateful to all the planetarians in Italy who enable us to continue to provide such a life altering experience to some very gifted educators.

Application Procedure:

Participants must send an application that includes your full name, complete address, year of birth and your curriculum vitae. Send this information along with a cover letter explaining why you wish to be considered for this experience. You must also include the text of a 60-minute lesson plan, with activities and stories that you would like to present for the students.

Send your application to:

Loris Ramponi, Osservatorio Serafino Zani, Via Bosca 24, 25066 Lumezzane, Italy; email info@serafinozani.it or megrez58@gmail.com.

Michele told me that she once had a University professor ask her if students should be required to understand the process of the phases of the moon since the concepts are so complicated. This prompted her to do her master’s thesis on applying Gestalt principles of visual perception to lessons about the phases of the moon. An activity she designed allows students to use a “frog’s eye view” to see the phases by viewing along the frog’s back. Photo taken by Susan But

March 2010

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(IMERSA, continued from page 40)
the word you’re looking for is “wow”

If you haven’t taken a close look at Spitz NanoSeam domes, then it’s time you did. NanoSeam is engineered to be the finest, most seamless dome screen in the world. Because there are no overlapping panels, the screen is perfectly uniform - even the rivets are flush with the dome surface. NanoSeam, combined with Spitz’ durable powder-coat finish, is the perfect dome for demanding display applications. That’s why NanoSeam is the choice of discriminating customers like The California Academy of Sciences and Yale University. Contact Spitz to learn more about the world’s leading projection domes.
**Planetarium Show Reviews**

**Extreme Planets**
- Clark Planetarium Productions
- Fulldome
- Running time: 31 minutes
- Audience: General audiences, middle school to adult
- MMurray@slco.org: +1 801-456-4949

The danger with any planetarium show that attempts to tackle such a contemporary and burgeoning field as exoplanets is that anything produced would be quickly outdated as new discoveries are made. Luckily for us, Clark Planetarium Productions has addressed this challenge by updating their show, *Extreme Planets*, with information on the Kepler space mission and recently photographed exoplanets.

These revisions and the quality of the original show itself make *Extreme Planets* an excellent choice for anyone interested in a show that accurately and engagingly explores this topic.

*Extreme Planets* begins with a brief series of visualizations and descriptions of different exotic planetary environments that will be returned to later in the show. It then launches into an explanation of what exoplanets are and focuses on a few specific examples, including 51 Pegasi, Upsilon Andromedae, Epsilon Eridani, and 55 Cancri.

Along the way the show details concepts such as “hot jupiters,” formation of planetary systems, and methods of detecting exoplanets. It continues with visuals and descriptions of planetary systems that may exist, such as a rogue planet in a globular cluster, a carbon-based planet, a water-dominated world, and the possibility of planets in binary systems. The show concludes with a discussion of the Kepler mission and the feasibility and methods that might be used in the future to detect evidence of life on Earth-like exoplanets.

Though I’m not an expert in exoplanetary science, the visual experience of the show seems sound. The physical traits of the different planets are outlined in a realistic and compelling manner. However, as the show transitions from explaining the traits of various discovered exoplanets to theorizing on exotic worlds that might exist, it may be unclear to audience members what is fact and what is speculation.

In addition, the very brief visualization illustrating the different methods of detecting exoplanets was done so well that it seemed a shame more time was not spent explaining the mechanics behind these processes. Indeed, with the exception of the Kepler mission discussion, the show seemed to gloss over how currently-known exoplanets have actually been discovered.

Visually, the show is very well done. It has an episodic nature with music and scene transitions between discussions of different planets that help move the show along and keep it from dragging. The visuals are very well rendered (I was specifically impressed by the pulsar-orbiting exoplanet) and do a wonderful job of transporting the viewer to these exotic locales. You walk away with a sense of the richness and diversity already found in our own small corner of the galaxy.

My only complaint with the visualization is that obviously liberty had to be taken in rendering the features of actual exoplanets. While this is certainly fine, I’m not sure the brief discussion on photographing exoplanets is enough for some audience members to realize that the displayed surface features of the planets shown are fictional.

The music for the show struck me as especially nice: upbeat and somehow wonder-inducing. I still believe though that the subwoofer manufacturers are in cahoots with planetarium producers. (Seriously: are subwoofers specifically installed in planetariums simply to scientifically-inaccurately indicate ominous planets lumbering into view? Couldn’t we at least try a show that in some way reflects the profound silence of space?) Rene Auberjonois (whose voice you might recognize as Odo on *Star Trek: Deep Space 9*) provides great narration.

In all, this is a truly excellent show. Exoplanets are perhaps one of the most exciting areas of active astronomy research, and *Extreme Planets* provides a way to take audiences there and show them how exciting this field truly is. It’s one thing for a planetarium show to open our eyes to the wonders of the planets of our own solar system. (Our audiences have probably all seen a few of those.) It’s another to adequately articulate the wonder of those new worlds we’re discovering in all directions around us. *Extreme Planets* does this admirably.

**Realm of Light: A Brief History of Life**
- Softmachine
- Fulldome
- Running time: 22 minutes
- Audience: General audiences
- [www.softmachine.de](http://www.softmachine.de)
- u.astigarraga@softmachine.de: +49 (0) 89 1890 826912

*Realm of Light*, a show produced and distributed by the Munich-based Softmachine, has made quite an impression in the fulldome community. According to Softmachine’s website, the show won a 2007 DomeFest Award in the U.S. as well as Best Immersive Award at the 2009 European Immersive Film Festival in Portugal.

What does this mean for a planetarium looking for a potential new show? For one thing, it means a gorgeous, well-executed production that takes fulldome to new levels in (as the above awards illustrate) immersion.

Put simply, *Realm of Light* is a beautiful show. The fulldome video sequences are stunning, and the accompanying sound track is just as lovely. If you’re looking for visual appeal on your dome, *Realm of Light* has a great deal to offer: fly-through of a nebula, death of a star, and a climactic solar eclipse that is possibly on par with seeing one in real life (because in real life you might neither have the soundtrack nor be on a space station).

In addition, *Realm of Light* is subtitled “A
Brief History of Life,” so besides the astronomical goodies listed above, the show contains visualizations of conditions on the early Earth, depictions of selected organisms from single cells up to whales, various landscapes apparently rendered to reflect an ambiance of “the dawn of life” (which do an excellent job), and a final sequence of an astronaut and space station. Each one of these scenes does what fulldome can do so well: create an immersive, breathtaking sense of actually being there. The scenes are powerful and effective in evoking feelings of awe.

But is this enough? What sort of scientific content can a viewer expect from the show? Softmachine provides an indication on their own website, where they state that the show is a “philosophical approach to the origins of space and our life.”

The show does begin with visualizations of the big bang and touches on the fact that stars are born in nebulae, but minimal explanation is given. It shows the death of a star and mentions stellar death seeding the universe for life, though the accompanying visualization (star-dust raining down on the Earth) leaves quite a bit to the imagination.

The subsequent scenes of the landscape of the early Earth, cells, jellyfish, nautiloids, whales, and finally astronauts don’t spend any time fleshing out the theory behind this progression. In fact, the science provides little role at all beyond scope for imagining beautiful scenes and philosophical musings.

And what sort of philosophy can a viewer draw from the show? It appears, both in the show’s description and upon viewing, that sharing this philosophy was a primary goal in the minds of the producers. That philosophy is much what you would expect from a planetarium show, though in this case the creators have used the context of evolution to highlight humanity as something profoundly different, having as we do the freedom to choose between “hate and love” or “darkness and light,” and to touch on evolution (perhaps paradoxically) as “nature’s miracle” having “infinite power” (though again, the mechanics behind natural selection are not outlined at all).

I think few would disagree with the epiphany displayed after the close of the final credits (“the essence of existence is love”), but potential purchasers should at least be aware that there is a message, and that the message is overt. And that the message is not necessarily “scientific.”

This is not a bad thing. Realm of Light provides an excellent example the fertile possibilities in cross-disciplinary work that the planetarium provides. Art, philosophy, science, and music are all melded in this show.

If one is looking for a (purely) scientific approach to theories about the origins of life, this is not the show to select. However, if one wants an immersive experience that could perhaps compliment an exhibit on the origins of life or stand alone as an artistic expression on the dome, I would highly recommend it.

Violent Universe

- Evans & Sutherland
- Running time: 25 minutes
- Audience: General audiences, middle school and up
- www.es.com/products/digital_theater/shows/ViolentUniverse
- +1 801-588-7500

Kudos to whoever first had the idea of asking science-fiction favorites to narrate planetarium shows. When I told my wife that I was reviewing a show narrated by Patrick Stewart, she was convinced I should purchase the show sight-unseen on that merit alone. Though I might not have her particular enthusiasm for Stewart as Captain Jean-Luc Picard, as far as narration goes you adoxically peaceful sight of a night sky, the show outlines things like galaxy collisions and galactic cannibalism, galactic dust clouds, supernovae, meteor storms, asteroid and comet impacts, and gamma-ray bursts.

As each of these astronomical catastrophes is explored, the show outlines what effects such occurrences might have for life on Earth.

Lest the audience leaves the show too uneven, at the conclusion of the show the narrator reiterates that all of these potentialities—though very real in the universe—at the current time don’t seem to pose much danger for life on our planet.

Violent Universe uses its catastrophic theme to discuss the science behind these different events. Still images are shown to explain how multiple wavelengths of electromagnetic radiation give information about the violence of various processes pictured. Historic records of observed catastrophes, such as the supernova of 1054 that formed the Crab Nebula and the Tunguska event, are discussed.

There’s an extensive discussion on various impact craters found around the world with excellent maps and aerial imagery. The explanation behind the mechanics of gamma-ray burst, however, seemed to skip over a key point. The show explains that as very massive stars collapse into a black hole, they emit beams of energy. However, there’s no explanation of why a collapsing star should focus released energy into beams at all.

Perhaps an explanation of what’s involved would have been beyond the scope of the brief discussion, but it’s a question operators might want to be ready to field from astute audience members.

Visually, Violent Universe does a good job of illustrating what a smooth transition from “traditional” to “fulldome” productions might look like. For example, portions of the show seemed like they would have been right at home in a traditional dome star field complemented with static horizon images and still shots faded in and out.

Other portions of the show—such as the excellent fly-through sequence of a galactic dust cloud—were effective as fulldome video sequences. For those who have gone fulldome but are still looking for some of the understat ed effects reminiscent of slide imagery might find this a good place to start.

Another unique trait of this show was its use of time-lapse photography for sequences like the stunning rise of the Milky Way along the horizon.

In conclusion, Violent Universe was an effective general astronomy show with a theme likely to be engaging to audience members. Portions of the show visually seemed more like the days of slide projection than fulldome video, but that is not necessarily a weakness.☆
A remembrance of the IYA, the latest information for your public audiences, and an excellent resource comprise this edition’s Reviews, gentle readers.

We’re still looking for readers who want free books or software in exchange for sharing your opinions. Contact me at the email address above.

Thanks to our reviewers for this column: first time contributor Warren Hart and veteran Francine Jackson.

**Eyes on the Skies: 400 Years of Telescopic Discovery**


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

The outside of this book has the imprint of the International Year of Astronomy, and it includes the “Official International Year of Astronomy 2009 DVD.” When you pick up this book, the cover is so striking, with its ethereal artwork of all the major Earth observatories, present and future, and the Hubble Space Telescope poised over them all, you have to see the inside. And that’s rather impressive also.

The authors trace the telescope from its apparent beginnings, a 1608 patent application by Hans Lippershey for a “tube to see far.” They also mention the possibility that rival Zacharias Janssen actually made the first working instrument, and possibly it could have been around for decades before them. Of course, we all celebrate the use of this invention by Galileo as an increase in his “natural vision” as he looked upward. This resulted in his discoveries of such wonders as the 3-dimensionality of the moon, the spotiness of the sun, the weirdness of Saturn, and the family of Jupiter, which caused him untold problems in his later years.

Since the telescope’s introduction, the desire for even more ability to observe the unseeable overhead has resulted in instruments from Herschel’s enormous creations, which “needed four servants to operate the wheels, ropes and pulleys,” to Lord Rosse’s “Leviathan of Parsonstown,” up to our own present leviathans, telescopes with mirrors larger than most contemporary houses.

And then we go “Beyond Earth,” to above the atmosphere, where we find the Hubble Space Telescope and those instruments meant to show us the parts of the electromagnetic spectrum invisible to our narrow range of seeing. We don’t stop there—we also venture into the future, with Earth-based telescopes that make today’s look like backyard equipment, and, perhaps, the next step: moon-based telescopes, especially on the far side.

The DVD is not just a repetition of the book. Although it does encompass basically the same information, it does so with enough variance that it could stand alone. In fact, I enjoyed watching this 55-minute presentation as much as I enjoyed reading the book, without feeling I had gone through the identical material twice.

Eyes on the Skies is relatively short, only 130 pages, but the images are fantastic, the artwork is beautiful, and this book and the DVD are well worth your time.

**Meteor Showers and Their Parent Comets**


Reviewed by Warren Hart, Mayborn Planetarium and Space Theater, Central Texas College, Killeen, Texas.

At 790 pages, some people may think this book will be too overwhelming to consider adding to their library.

Au contraire, mon amie!

At the very outset in the preface, Dr. Jenniskens sets the tone of the book in an informal and conversational format. He writes, “It was a warm summer evening in June in the light polluted Dutch city of Leiden in 1981 when I first sat down and gazed at the sky, waiting. A meteor appeared and I made a wish: ‘One more, please!’ After 90 minutes, I had plotted four arrows on a chart of stars. That record still exists and has played a small role in the ongoing exploration of meteor showers. A very modest beginning to what has become a lifelong adventure.”

He continues later in the preface to lay out the book’s purpose in the same conversational format: “In this book you will find much practical information about when to see meteor outbursts in the next 50 years and how they might manifest... While writing this book, I found that many of our main meteor showers are the product of comet fragmentation... If you are a professional astronomer, you will find in this book an overview of your work and that of colleagues who have helped illuminate the evolution of meteoroid streams, the physical properties of their parent bodies, their influx on Earth’s atmosphere, their danger to satellites in orbit, and their role in the origin of life.”

As I continued to read, I felt as though the author had invited me to sit down with him in his study so he could share his passion, joy, and excitement of what he and others have learned about meteors and comets.

In Chapter 1, “How meteor showers were linked to comets,” he gives the history of mankind’s evolutionary understanding of “shooting stars.” As a minister I was intrigued by his comments on page 4: “...meteor showers were either a good or a bad omen. The periodic meteor storm of April 3, 1095, for example, was mistaken by the Council at Clermont, France, for a celestial monition that the Christians must precipitate themselves in like manner on the East, when Pope Urban II called for the first crusades in November, 1095.”

Dr. Jenniskens continues with “The Leonid storm of 1833 changed all that and made meteor showers part of astronomy. It came at a time when Isaac Newton’s law of gravity had
just been established... Meteor showers were now understood as being the result of streams of meteoroids, most no bigger than a grain of sand, approaching from one direction, before colliding with our atmosphere.”

The book’s 34 chapters are divided into six sections: (I) Introduction, (II) Parent bodies, (III) Young streams from water vapor drag, (IV) Young streams from comet fragmentation, (V) Old streams and sporadic meteoroids, and (VI) Impact and relevance of meteor showers.

Do not think that this book lacks in-depth scientific information for the professional astronomer. It does. Parts II-V (Chapters 6-31) go into great detail describing and explaining specific types of comets (Long-period, Halley-type, Jupiter-family, et cetera) and meteor streams (Leonids, Ursids, Perseids, Quadrants, Geminids, Toroidal, et cetera).

When I came to Chapter 33, “Meteor showers on other planets,” I thought that would be interesting. But I found an unexpected resource: on pages 561-564 is information about “Meteor showers on the Moon.” He writes, “Each year, 83 boulders larger than 1kg hit the face of the Moon, and about six larger than 5kg. Good opportunities for viewing are summarized in Table 10c.”

I did not realize that impacts on the moon could be visible here on Earth! So, I looked at Table 10c, “Good opportunities to watch for Moon impacts from Earth.” In 2010 there are seven meteor streams listed, with two of them to be “favorable geometries.” As a result of my reading, our planetarium presentations and our newsletter will include announcements and encouragements for people to look for possible impacts.

The appendix has seven addenda and 11 tables, a comprehensive 23-page index, and a final one-page list of mathematical units and constants.

Particularly helpful were Table 7: “Working list of annual (cometary) showers.” Its 56 pages lays out in great detail the “Recently active meteor showers and their parent comets.”

Table 11: “Calendar of exceptional meteor showers (2005-2052) lists notification of the probability of some coming “biggies.” He has five listings for 2010, so get ready!

I heartily recommend Dr. Jenniskens book for either your personal or your institution’s library. It will provide much helpful information for many years to come.

Heaven’s Touch

Reviewed by Francine Jackson.

Jim Kaler missed his calling. Oh yes, he’s a great astronomer and all that, and one of the best public astronomy voices ever (regardless of what other polls say). Read this book. You will find yourself listening and capturing information from the mind of someone who treats science as more of an ethereal topic; not as a bunch of formulas, but as a thing of beauty.

Anyone can read Heaven’s Touch, from the hardcore scientist to the newly-introduced amateur, and come out with a better understanding of the subject. For the newcomer, it is a comprehensive learning tool, an introduction to the subject. For the old-timer, it is a chance to open our eyes and see this science we love so much in a different perspective, as a universe of the beautifully unique.

For example, his section on aurorae begins “We left the sun with a CME pounding down the solar wind and aiming at Earth.”

How was Pluto discovered? “Even with Neptune in the equation, Uranus still refused to behave itself.” Well, of course!

And, “...the discovery of Pluto...was, however, a tiny thing in a wacky orbit that could not possibly have enough mass to affect Uranus. Instead, Pluto’s discovery had been ‘accidental,’ except that years of work by Tombaugh had hardly made it an accident.”

Starting in the preface, Kaler reminds us that “Most books are about ‘something,’” although, “[T]his one seems to be about ‘everything,’ everything I know that would be relevant to how we are directly connected to the heavens...to the entire Universe.” In this book is literally anything you would want to know about some of the major mysteries of our universe, from tides to black holes, from asteroid attacks to hyperstars. There was just one thing I noticed missing in this book: Questions.

Many of you, probably like me, teach astronomy to either the general public or to the underenthusiastic underclassmen trying to slog through any science discipline they feel they can pass. But, what if the text, instead of mainly disseminating facts, also expressed the world around us as a thing of beauty, a part of everything, willing to show its interrelationships? Could we list Heaven’s Touch as required reading for Astronomy 101? Add a few related assignments to each chapter, and we have a book worthy of classroom use. The science lovers will appreciate the information, the humanities students will love the way it’s written (and just might read it, more than they would a typical text), and the total school haters might not complain; after all, it hardly resembles one of those 20-pound tomes from the other classes.

Once again, Dr. Kaler has done his job, and done it well. He has written Heaven’s Touch to bring the joy of science to anyone wanting to collate everything in the universe.☆

(General Counsel, continued from Page 62)
It Takes Two

It takes two video projectors... no more and no less, to create the world's best HYBRID planetarium skies. While other manufacturers may use 5 or even 12(!) lower-resolution video projectors, GOTO INC uses two high-resolution projectors with custom-designed GOTO-manufactured lenses to give superior results.

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Just announced: CHRONOS II Breakthrough!

The super-bright LED illumination of the CHRONOS II has been confirmed to be great for domes all the way up to 16 meters in diameter! This re-designed opto-mechanical projector can now fill domes with more than 4 times the light of the old CHRONOS, making it the perfect pairing with video in even larger HYBRID dome applications.

Learn more at: [www.goto.co.jp/english/index.html](http://www.goto.co.jp/english/index.html)
This issue led off with a letter from Jay Pasachoff (Williams College, Massachusetts) disputing John Mosley's comments on mention of supernovas in a Christmas show in the prior issue. Mosley's reply pointed out a need for brevity and no need for excessive technical detail.

K. C. Leung (Hong Kong Space Museum) described use of an all sky system to depict a space colony, and how artists accomplished this.

The paper by Dave Menke (Copernican Space Center, Central Connecticut State University) from the 1984 IPS conference was reprinted. It described a survey returned by 519 planetariums (56%) in the USA. Directors' backgrounds, education, pay, length of service, and how they entered the field were covered.

Michael Zeilik (University of New Mexico) wrote about Native American archeoastronomy of the Southwestern United States and using a planetarium to demonstrate how the solstices were predicted for important ceremonies. Audience reactions were positive.

Carl Wenning (Illinois State University) incorporated a supernatural explanation for the Star of Bethlehem in his Christmas shows (the Shekinah, using the somewhat disputable interpretation of this term as "the glory," although not mentioning this is not the only proposed meaning of the term). Audience surveys found that Star of Bethlehem audiences were far less likely to attend other planetarium shows throughout the year than were general audiences at other shows.

Jack Spoehr wrote a remembrance of Herbert N. Williams, who over the years had worked with Armand Spitz, at Cranbrook Science Center (Michigan), and at Spitz Space Systems.

Incoming IPS President Alan Friedman gave his first message. The first all-Europe planetarium meeting had been held in Strasbourg, with more than 100 representatives of planetariums, large and small, in many nations. The first IPS council meeting outside the United States was to be in Armagh, Northern Ireland.

John Wharton's "Gibbous Gazette" described the plans and procedures for the "teacher in space" program. Sky-Skan had bought out Talent, and Fred Schaaf was heading a "dark skies for Halley" campaign.

The Planetary Society had more on "the case for Mars," still unfulfilled. NASA was distributing tomato seeds that had been in space.

Two other deaths in the field were announced: Henry Blake, whose AZP firm produced amazing zoom lenses for regular slide projectors, and William Sharp of the New Jersey State Museum Planetarium.

Jack Dunn did the Regional Roundup for the last time, listing only four.

Mark Sonntag's Focus on Education column looked at what young adults (defined as 26 to 35 years of age) knew about science. Assessments were from 1972/73 (2000 subjects) and 1976/77 (1300 subjects). All groups got fewer than 50% of questions correct (examples included what direction are you looking for the sun if a full moon is rising), but women did worse than men and ethnic minorities worse than whites. There was a small decline from 1972/73 to 1976/77. A retest today might be even more depressing.
2010
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 Planetariums (PLANIT), XXV National Conference, Perugia, Italy, www.planetariitaliani.it. Contact: osservatorio@serafinozani.it
5-7 May. Canadian Association of Science Centres Annual Conference, Montreal, Quebec, Canada, www.canadiansciencecentres.ca/main.htm
7-8 May. Annual Conference of the British Association of Planetaria (BAP), Intech Planetarium, Winchester, Great Britain.
19-22 May. Middle Atlantic Planetarium Society (MAPS) Conference, University of Southern Maine-Southworth Planetarium in Portland, Maine. They have extended a very generous room rate of $99.00 per night. The hotel has ample meeting space for the general sessions as well as for vendor exhibits.
The hotel is located in the heart of downtown Portland, just four blocks from Historic Old Town Portland and Portland Harbor. The hotel is just minutes from the Portland Airport and has shuttle service to and from the airport.
Additional conference information and registration materials will be forthcoming. More information is available from lasala@usm.maine.edu and egleason@usm.maine.edu, or www.maps-planetarium.org.

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19-22 May. Middle Atlantic Planetarium Society (MAPS) Conference, University of Southern Maine-Southworth Planetarium in Portland, Maine. See details at left.
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. sepadomes.org.
2-7 July. EuroScience Open Forum (ESOF), Turin, Italy, www.euroscience.org
11 July. Total solar eclipse
4-7 August. Western Alliance Planetarium Conference (GPPA, SWAP, RMPA, PPA) will be hosted in Omaha, Nebraska, USA, by the King Middle Magnet School Planetarium. Contact: Jack Northrup, jlnorthrup@fbx.com; www.spacecabin.com/gppa
17-20 August. 7th European Meeting for Small and Portable Planetariums. Ilpo Kuusela and Arto Oksanen of the Kallio Planetetario will host this conference in Finland. Contact Information: ilpo.kuusela@kallioplanetetario.fi; www.kallio-planetetario.fi.
2-5 October. Association of Science-Technology Centers (ASTC) Annual Conference, Bishop Museum, Honolulu, Hawaii, USA. www.astc.org
20-23 October. Great Lakes Planetarium Association Conference, University of Notre Dame, Indiana. Host will be Dr. Keith Davis at keith.davis.dvt@nd.edu. www.glpaweb.org/conference.htm

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
31 March. Deadline for application for scholarship funds (IPS support Baton Rouge Conference attendance by individuals). www.ips-planetarium.org
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/Wek_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
Sky-Skan’s new Manual Control Boards for definiti Digital Theater System

Sky-Skan has developed a new set of manual panels for their definiti full-dome projector system. The pictures here are of a set of custom panels developed specifically for the California Academy of Science’s Morrison Planetarium. Complete control of the various functions of system is available, and computer screens add more information for the theater operator’s convenience.

Above: An overview of the manual panels for the definiti full dome system at the Morrison Planetarium.

Below: Closeup of one of the manual panels produced for the Morrison Planetarium at the California Academy of Sciences

For more information, contact Sky-Skan at 51 Lake Street, Nashua, New Hampshire 03060 USA; +1 603-880-8500; e-mail: office@skyskan.com; website: www.skyskan.com.

Astro-Tec Builds the World’s Largest Planetarium Dome: 35 Meters

Canal Fulton is a small historic town in rural Ohio, but in addition to its annual Olde Canal Days Festival, it can now claim fame as the place where the world’s largest planetarium dome was constructed.

Astro-Tec is in the process of building a 35-m (114-ft) dome for the Nagoya City Science Museum’s planetarium in Japan. Astro-Tec is scheduled to start the dome installation in March 2010. Also included in the Nagoya City project is Konica Minolta, Zeiss, and Sky-Skan. For more information, contact: Astro-Tec Manufacturing, Inc. 550 Elm Ridge Avenue, P.O. Box 608, Canal Fulton, Ohio 44614-0608 USA; +1 330-854-2209.
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JUNE 15-19 – ADVANCED WORKSHOP
JULY 20-24 – NOVICE WORKSHOP
JULY 27-31 – ADVANCED WORKSHOP
weber.edu/planetarium/training
The creativity of humans never ceases to amaze me. Listening to students working out a problem, working with colleagues to develop new programs, guiding telephone questioners through the best way to observe a meteor shower from wherever they're calling: the list is endless.

One of my favorites is teachers’ names for our planetarium programs. During the introduction to each program, we tell the audience the name of the program they’ll be seeing, and give a short summary of the learning objectives.

At the end of each school show, as I’m bringing the lights up, I ask the teachers and group leaders to take about 30 seconds to complete the evaluation form they received at the beginning of the program. I indicate where the extra forms and pencils are located, gesture to the box for dropping off the evaluation, and point out the other box with post-visit activity sheets.

Reading through the collected forms after a recent Constellation Coloring Book presentation was interesting. It’s a program we developed for second graders that emphasizes star color, size, brightness and constellation patterns. Students pretend to paint the day sky blue, color the sun into the day sky with imaginary crayons, connect stars into patterns, and star-hop among winter constellations, ending with an edited version of the “Androcles and the Lion” fable of Aesop fame.

A number of teachers had seen Constellation Coloring Book. Others apparently saw “Coloring Book Constellations,” “Coloring Book,” “Constellation Cloring (sic) Book,” “Constellation,” “Crayon Constellations,” or (my favorite) “Winter Star.” Maybe there’s a way to harness this talent - inventing names for new programs?

Just Selling Light Bulbs

The Brest Planetarium in Jacksonville, Florida was running Saving the Night, a program produced by the Southeastern Planetarium Association. The audience is shown the night sky from city and country environments to demonstrate the difference in sky glow, and there’s a discussion of light pollution and how “regular people” can help combat it. Ideas include turning off lights and installing full cut-off light fixtures, relatively simple acts that save energy.

Sarah McDonald reports that one patron “left the show in disgust, saying, ‘That’s just an advertisement. You guys are just trying to sell light bulbs!’”

When Pat McQuillan was at Brest, he reported a third grader entering the planetarium for the first time and exclaiming, “This place is cool as hell!”

Getting Us There

Alan Gould shared a message from a Kepler teacher workshop participant, Richard Dierking:

A couple of months ago, I did a Kepler presentation with groups of GATE (gifted and talented) students at an elementary school. At the end of these presentations, I always like to ask, “So, let’s say we do discover Earth-like planets. What then?”

As usual, one of the kids answered, “Well, we go there.”

“But it’s SO far away,” I replied. During the presentation, I describe a light year and how far away even the closest stars are. However, this time, another kid that was intently following the whole presentation, answered, “Well, Mr. Richard, don’t worry about that! You just show us where they are, and we’ll figure out a way to get there.”

Wow, I enjoy sharing information with these kids.

Did I Forget Wrecking Havoc?

An e-mail message from fellow Southeastern Planetarium Association colleague Dave Hostetter:

Hi, April:

I received a list from Adam Thanz of SEPA presidents since I am on the new Nominating Committee. I just realized you will be president from January 2011 through the end of 2012. Has anyone else noticed that we elected you president and the world’s coming to an end? Hmmmm.

I’ve compiled a list of over 100 ways I have heard that the world will end in 2012, but I guess I overlooked the obvious one! Dave

His list, gleaned mostly from the Internet, is truly impressive. For those preparing planetarium programs about the end of the world, aka 21-12-12 (or 12-21-12), here are a few: Ways the sun will kill us:

• Solar storms will wipe us out because of the sudden loss of our magnetic field.
• The sun will die.
• The sun will blow up.
• The sun will rise from the west on December 21, 2012, wreaking havoc.
• The sun will go out of alignment, causing major earthquakes and chaos.
• The sun will have a radioactive reaction, wreaking havoc.
• When the sun aligns with the great central galaxy, it will receive a spark of light that will cause the sun to shine more intensely, producing solar flares. This will also cause changes in the earth’s magnetic field, which will cause catastrophic changes in Earth’s rotation. This will surely wreak havoc.
• The sun will block the black part of the universe. When that occurs, bad things happen.
• Let’s have a contest. What’s the best “end of the world” scenario you’ve heard? Send your entry to me at the email address above. Maybe we can find a 2013 calendar for the winner.☆
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Dream it and we will deliver it
360°

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Digital Planetarium
Simulation Software
Production Software
Fulldome Production
Dome Screen
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