



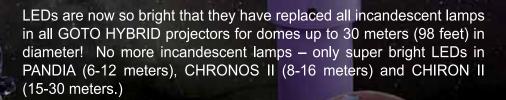
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PLANETARIAN

September 2013

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A beautiful view behind the dome of the New Digital Planetarium in Athens. For the story of its first 10 years, see page 10. Courtesy Eugenides Foundation.

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In Front of the Console

Sharon Shanks Ward Beecher Planetarium Youngstown State University Youngstown, OH 44555 USA

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I had a couple of interesting responses from my column in the June issue, when I basically wondered about the cost of full-dome programs for planetariums with little or no money and how the fiscal gulf between big production and small budgets could be bridged.

Before sharing those, however, I promised the other end of the time "bookend" that had attendance at IMERSA in February as one end

and the Ohio planetariums meeting at the other.

In April, Ohio planetariums visited two planetariums in the Dayton area: the Boonshoft Museum of Discovery in the city and the Smith Middle School Planetarium in Vandalia nearby. On the surface, the two were a study in contrasts.

The Boonshoft, home of the Caryl D. Philips Space Theater's 50-ft dome and Digistar 4, is a medium sized wellmaintained, well-run, and well-loved facility that knows its audience: children of all ages and their parents.

They also have a museum director that supports the planetarium, which I could tell as soon as I walked in and noticed they were running One World, One Sky, a program

that I would give my eye teeth to show in my dome but cannot afford.

The planetarium is directed by Cheri Adams, with staff Jason Heaton, Joe Childers, and Kevin Schieman. They produce their own programs, interspersed with purchased programs that are pure astronomy or relevant to exhibits at the museum.

Then we moved to Vandalia, a cash-strapped rustbelt town and the equally cash-strapped middle school planetarium. Here, Scott Oldfield works in a typical school facility of 30 years ago: a 30-foot dome, a Viewlex/Goto Venus, 60 seats, and a non-existent budget. He relies on his own ingenuity and luck to keep the equipment running, and most of his non-starfield content is provided by two vid-

eo projectors. The teaching tools he uses came from cash from his wallet.

Those are the immediate contrasts. But the two facilities share the all-important passion for teaching astronomy the infuses us all, and the value of this passion defies a price tag. In my eyes, this commonality makes them equally valuable and important. The only difference between the two, of course, is money.

Oh, for a future envisioned by Gene Rod-

Gould The Futher

From Scott Oldfield's presentation at

Smith Middle School in Vandalia, Ohio.

Note goal #2, a goal for many school dis-

trict planetariums. Apologies for the poor

quality image from my cell phone.

denberry and Star Trek, when the search for knowledge, and not money, is paramount. In that world, Scott Oldfield would have all the latest technological tools at his fingertips to teach astronomy and inspire future generations. I wish this for him.

We don't have that world, so we do the best we can with the tools we have and carry on.

And, as I wrestle with writing about today's world, it seems all

too possible that 99 percent of us, the planetariums who have a harder time every year finding funding, will all be Vandalia one day: operating by passion and duct tape alone, until the passion is beaten out of us or our equipment fails.

Yes, that's pessimism at its finest.

Can we get some optimism here?

At this point in my column I would love to offer something optimistic to counter all those dark thoughts. Something comforting, at least, would be appropriate: "this, too, will pass." Or maybe something astronomical: "in terms of cosmic time, our lives are simply a blink of an eye." Or maybe something funny, so at least I could make you laugh.

But I cannot do that, because I simply cannot think of something positive at the moment

I cannot bring myself to be enthusiastic when hearing about two school district planetariums in the Southwestern Association of Planetariums area have closed (International News, page 70), and especially not with the news that the only planetarium in Guam has closed (see page 66.)

It is wonderful to celebrate in the pages of this journal the upgrades and renovations to facilities being made. I have to wonder, however, how many small planetariums are closing at the same time that we never learn about.

I refuse to think in terms of impersonal cosmic time, because this is our time. We're living this and struggling with this right here and right now. It's the only time that matters to us.

And, in the past 25-30 years, many of us have personally observed the first slow, and then rapid, decline in what we consider to be quality standards in learning, funding, work ethics, common sense, and, simply, kindness to each other as humans.

I know, and I think everyone else does as well, that there is no easy solution to the funding problems we're facing, or even if a solution is possible.

I do know that we will carry on as we always have: doing the best that we can with the tools that we have. Our bright moments always will be the spark of enthusiasm in young eyes, or the "thanks for a great show" from an audience member, or maybe a hug from a first grader.

So, while I'm trying to stay upbeat, I'm hoping that improved communication with each other, one of founding tenants of IPS, will help find some answers for us.

Communication from down under

One of the first responses to my June column and its plea for, well, communication, came from Australia and Jerry Grayson, a newcomer to the fulldome field.

From the viewpoint of a producer (who just made a first film for IMAX called *The Earth Wins* that you can check out at theearthwins. com/trailer), he's daunted by the complexity and lack of standards in the fulldome planetrium community.

Also, as someone who geared the film for the educational market, he also is puzzled by the hurdles that we, the planetariums, throw up for him in terms of length, format, and content.

His film cost approximately \$4 million to make. At my suggested \$3,000 as a comfortable budget amount, that means he'd have to sell it to 1,333 venues to break even.

It's pretty easy to see how impossible that is (Continues on Page 68)



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Letter to the Editor

To the Editor:

I want to correct a few factual errors in the recent article "Stratoscript Compendium Rings" [June 2013, page 26] and expand a little on some of Lionel's thoughts.

To begin with, StratoScript is the proper capitalization. This is a trademark of Digitalis Education Solutions, Inc. Secondly, contrary to the article, I personally designed and implemented the StratoScript language and scripting engine in Stellarium and later Nightshade. While I consulted with Stellarium project lead Fabien Chereau on integration questions, his role was minimal.

Thirdly, we officially split Nightshade from Stellarium in December, 2009 (not 2008). After Fabien unilaterally removed the Strato-Script engine from Stellarium, it was clear our priorities were not in alignment. To make it simpler to follow the many changes to the Nightshade project, we just published an easy to read timeline: nightshadesoftware.org/projects/nightshade/wiki/Project_History.

Lastly, I wanted to expand a bit on script sharing. As Lionel mentioned, these are orders

of magnitude smaller in size than fulldome video, making them extremely easy to distribute. With free authoring tools, there is no direct monetary cost to start creating scripts, and the learning curve is not large. For example, I intentionally designed StratoScript for non-programmers.

Another huge benefit is that you can easily customize a script for your needs now or in the future. Just try doing that with full-dome video. As real-time software and hardware continues to improve, your scripts can even look better and better over time! Plus, you can run with your own sky settings rather than the generally poor starfields from full-dome video. I was just remarking the other day that a number of real-time systems produce a dramatically more realistic Earth than many fulldome shows.

The main disadvantage to scripts is the inability to share with ANY planetarium. There is no standard scripting language supported by every projection system. That means you have only a subset of all planetaria you can share your script with. (Sharing does not mean

you need to give your scripts away for free, but most do since production costs are so low.)

To my knowledge StratoScript is the only planetarium scripting language with either an openly-published definition or a free implementation. But given that each system will have different features or different implementations of similar features, we can never expect to have perfectly consistent results across varied systems. Obviously I'm biased, but could StratoScript be the common denominator scripting language we need?

Rob Spearman President, Digitalis Education Solutions, Inc. Bremerton, Washington, USA

Lion Ruiz responds: Great explanation you gave. Nothing to add.

You could also raise the fact that regionalization (changing language) is easy with this kind of process and don't need to recalculate many things. That's also why the compendium works fine as an international contest. \(\pi\)

Undaunted

Story of people behind the Allegheny Observatory is wonderfully done

Sharon Shanks Planetarian Editor

There's an adage along the lines that we don't value things close to home as much as those at a distance; that we have to travel to some distant city for the newest and best.

I am ashamed to say that for me, the Allegheny Observatory in Pittsburgh, Pennsylvania (basically next door), fell into the adage



category. Yes, I've visited it numerous times, both for work and conferences. Yes, I thought I knew its history, and I appreciate the grandeur of its marble halls and handcrafted woodwork—not to mention the jaw-droppingly-beautiful stained glass Urania in the lobby.

But, until I saw *Undaunted: The Forgotten Giants of the Allegheny Observatory*, it hadn't sunk in that this observatory and its history played such a vital role in the history of astronomy.

Thank you, Dan Handley, for taking the observatory's story off the shelf, shaking off its dust, and setting it out for all to see its true worth.

As anyone who deals with planetarium shows knows, there are good shows and there are great shows, and then there are the rare shows that are superb: the ones who hit every aspect of production square on the head and nail it.

Handley's first nail is the title: the show is about the observatory, yes, but it's also about the giants who worked in its halls and with its telescopes. It's about their commitment to their science and their passion for astronomy.

The program starts with a solid introduction to spectroscopy, given by Dr. Neil deGrasse Tyson. Tyson's appearances are balanced and deliberate: when you see him, you know that the hard science is coming and it will be explained clearly and with Neil's trademark comfortable conversational style. Nicely done. Tyson's celebrity is not overworked and is used as a production benefit.

Spectroscopy leads us to the observatory's first director. Samuel Pierpont Langley (yes, that Langley, whose name is now eponymous with science and advanced aeronautics in this country) started with a table and three chairs and no budget. To raise funds to operate the observatory, he used a maritime idea he saw at the Greenwich Observatory and "sold time" to the growing US railway system that eventually led to railroad standard time and the five time zones now used in the US.

Langley's early spectroscopy work at the Allegheny led directly to our understanding of atmospheric warming by the sun, the greenhouse effect, and today's climate studies.

Intrigued by powered flight, Langley did his early research in aerodynamics in the observatory's back yard, and was barely beaten in the race to the skies by the Wright Brothers, who themselves were indebted to Langley's research for their success.

A young John Brashear brought his early engineering genius to Langley to discuss optics and telescopes, and was set along a path

(Continues on Page 24)

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President's Message

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Dear Fellow Planetarians:

On July 19 at 21:30 GMT, I gazed up to Saturn and our moon and was overwhelmed. This was the moment when NASA's Cassini spacecraft imaged Saturn and its entire ring system during a total eclipse of the sun, capturing, in natural color, a glimpse of our own planet. It was the first time Earthlings knew in advance that their picture would be taken from a billion miles away.

It was an opportunity for everyone around the globe, at the same time, to savor the uniqueness of our beautiful blue-ocean planet and the preciousness of the life on it.

While Earth is only about a pixel in size from Cassini's vantage point 1.44 billion kilometers away, this picture unites us all on Earth. "Consider again that dot. That's here, that's home, that's us. ...on a mote of dust suspended in a sunbeam," as the unforgotten Carl Sagan once put it.

Connecting the Pale Blue Dot

It is interesting to know that Cassini Imaging team leader Carolyn Porco was involved, along with Sagan, in initiating and executing the famous "Pale Blue Dot" image of Earth taken by NASA's Voyager 1 from beyond the or-

bit of Neptune on January 14, 1990.

For me, that evening in July, "The Day the Earth Smiled," had yet another impressive aspect. I was in South Tyrol/Northern Italy that day and it was the night before the opening of a new planetarium.

Just an hour before the picture was taken, I was sitting under the 8-m dome of that planetarium, looking back to Earth in stereoscopic 3D through the magnificent ring system of Saturn. Breathtaking! Yes, I had both perspectives.

Using our wonderful tools

This was a special example as to what we as planetarians can do with our great tools. Independent of dome size, we can put discoveries and events in perspective and offer new perspectives on our world. Just imagine what wonderful stories you are able to tell around that image alone to people of all ages.

Yes, I am also a big fan of a beautiful night sky and analog star projectors, but in the interest of our mission to educate people about who and where we are in this ever-more exciting cosmic landscape, real-time simulations in a digital planetarium offer us breathtaking and boundless opportunities to change perspective and understand our world in a bigger context. Let us use them wisely. and especially in connection with real sky and space events.

IPS Council in South Tyrol

Speaking of South Tyrol and education: the brand new South Tyrol Planetarium is the location where IPS Council gathered August 9-10. This site is a very interesting model for science education, because it is a vital part of the so-called "planet school" which serves people of all ages in the valley near Bolzano. It combines kindergarten and elementary school with library and planetarium.

Its "planet academy" will also excel as a "summer school for planetarians," where planetarians from different countries will be allowed to apply to learn how to operate a planetarium and create educational planetarium content. This European site for professional development will benefit from the expertise and support of IPS.

More about this interesting project and plenty of other results from our IPS Council meeting will be published in my December message.

By then, you will know who will be the host for the IPS 2016 conference. It was a tough choice again. There were three excellent bids: Telus World of Science (Edmonton/Canada), Cite Espace (Toulouse/France) and Kopernikus Science Center (Warsaw/Poland). I urge the two bidders who did not succeed to consider presenting a new bid at IPS 2014 for hosting IPS in 2018

IPS 2014 in China

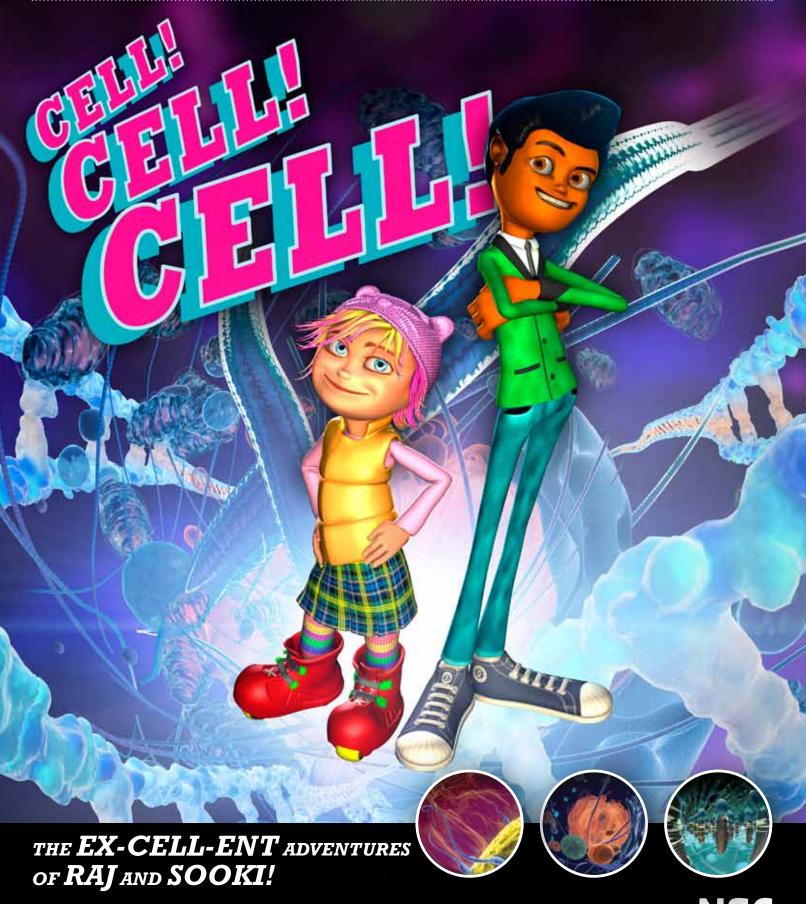
The next IPS conference is less than a year away. On June 23-27, 2014 we will convene in

(Continues on Page 34)



The IPS Council at its off-conference year meeting in South Tyrol, Italy. Photo by F.M.Arndt

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NSC creative



Dr. Manos Kitsonas, Technical Director Dr. Alex Delivorias, Science Advisor Eugenides Planetarium Athens, Greece

On 3 November 2013, the New Digital Planetarium of the Eugenides Foundation in Athens, Greece, celebrates its 10th Anniversary.

Having already produced 21 digital planetarium shows and an equal number of study guides, having organized numerous public lectures, conferences and astrophotography exhibitions, and having, so far, attracted an estimated 3,500,000 visitors, the New Digital Planetarium continues to honor the last will and testament of our national benefactor Eugene Eugenides (1882-1954).

Eugene Eugenides, the shrewd businessman and ship owner, who established the educational public benefit institution which bears his name, would never have dreamt the extent to which it has developed since it was established in 1954.

The main mission of the New Digital Planetarium is to communicate the achievements in science and technology to the wider public, to inspire its visitors by demonstrating the nature of scientific inquiry, and to cultivate their sense of curiosity and wonder about the natural world.

Today, Dionysios Simopoulos, the planetarium's director, and Manos Kitsonas, its technical director, collaborate fully with its scientific and technical staff, using all the impressive creative and technical capabilities of modern audiovisual media and technology to "narrate" the history of science in this most fascinating and enjoyable way.

The background

Since its establishment in 1954, the key mission of the Eugenides Foundation has always been to implement the wishes expressed in the last testament of Eugene Eugenides, namely "to contribute to the education of the Greek youth in the fields of science and technology."

To attain this objective and, at the same time, to ensure its long-term financial independence, Eugenides bequeathed a large part of his fortune to the foundation. Indeed, from its inception to the present day, the Eugenides Foundation has operated and continues to do so without any state or other financial assistance whatsoever.

Eugenides entrusted the administration of his estate and the execution of the terms of his will to his sister, Marianthi Simou, who made the fulfilment of her brother's wishes her own life's work, and did so with great success.

Eugenides, however, did not specifically define the directions that the foundation should follow. He left that to the discretion of the foundation directors. As such, his sister and first governor of the foundation decided to add a planetarium to the foundation's complex, following the recommendations of her advisers.

Thus, the original Eugenides Foundation building on Syngrou Avenue was inaugurated on 7 June 1966, and on the same day the first planetarium in Greece began its operation, equipped with a Zeiss Mark IV planetarium projector donated by Nikos Vernikos-Eugenides, later to become the next president of the foundation.

In the summer of 1972, the Hellenic Astronomical Society invited Dionysios Simopoulos as a keynote speaker at a symposium, and he, thus, was given the opportunity to meet with Marianthi Simou.

That meeting proved decisive and in the spring of 1973 Simopoulos assumed his responsibilities as director of the Eugenides Planetarium, a position that he holds to this day.

Influenced by his five-year experience as curator and later as director of the Zeiss Planetarium at the Louisiana Arts and Science Center (now LASM) in Baton Rouge, Simopoulos introduced several artistic and directional innovations in the planetarium's shows, insisting at the same time that all audiovisual equipment must always be upgraded to the latest developments in planetarium technology, an "attitude" which resulted in quadrupling its audience.

A new era begins

In 1978, the Eugenides Planetarium, in cooperation with the Armagh Planetarium in Northern Ireland and the Hamburg Planetarium in Germany, established the European Mediterranean Planetarium Association, the first ever non-North American plan-

etarium association affiliated with IPS. This was a very important step in making the International Planetarium Society truly international and resulted in the establishment of many regional and national IPS affiliates in the following years.

The Eugenides Foundation also has sponsored the IPS-Eugenides Script Contest Awards since its establishment in 1984, and continuously cooperates with the IPS Council in finding the best way to continue implementing an awards scheme for the future.

When Marianthi Simou died in 1981, she, too, left virtually all of her estate to the foundation. The administration was taken over by her associate and Eugenides' godson, Nikolaos Vernikos-Eugenides, who, as president of the foundation, continued the work of his predecessors with undiminished enthusiasm.

The mission expands

During the next 20 years Vernikos-Eugenides went on to expand the foundation's activities into new areas, realising early on that if the original mission of the foundation was to continue, it was necessary to update its ser-

vices to the public and face the challenges of the 21st century with a totally renovated structure and services.

In 1996 Vernikos-Eugenides decided to donate a particularly sizeable grant to expand the facilities and activities of the foundation, which, according to his vision, would consist of a new state-of-the-art digital planetarium as well as a permanent Interactive Science and Technology Exhibits area.

In the exact same year, the IPS recognised Dionysios Simopoulos's lifetime dedication in science education and in the dissemination of science to the general public by awarding him the 1996 IPS Service Award.

Vernikos-Eugenides, meanwhile, for the four years preceding his unexpected death in November of 2000, participated decisively in the efforts that would turn his vision into reality, in close collaboration with Simopoulos and the planetarium's scientific and technical staff and through extensive consultations with experts in the field from abroad.

This vision continues, now carried on today by his successor and new foundation President Leonidas Demetriades-Eugenides.

Today's building and equipment

Construction for the New Digital Planetarium began in the spring of 2000, concurrently with the "digital revolution" that had already started spreading across the planetarium world. After three years of extensive reconstruction and additions to the original building complex and almost





Facing page: Viewers enjoying a show in the New Digital Planetarium's 25-meter dome. All images courtesy Eugenides Foundation. Ine Eugenides Foundation building, with the new dome on the left next to the old one in the center. Next, the impressive projection booth with the on-line digital systems on the left and the 1570 film system on the right. Bottom: a fish-eye view of the theater, and the theater console. Center: A poster of the show *The Day Star*, a Eugenides Foundation production.

Right: Viewers queuing well outside the planetarium entrance. Below: The New Digital Planetarium organizes many astrophotography exhibitions.

40 years since the creation of the first Eugenides Planetarium, its state-of-the-art successor opened its doors to the public on November 3, 2003.

The venerable Zeiss Mark IV projector that lit the skies of its 15-m dome from 1966 to 1999, is still in its place, but the old planetarium chamber has become the exit lobby of the New Digital Planetarium.

The New Digital Planetarium is a large amphitheatre with a 23.5 degree tilt under a 25-meter dome by Astro-Tec. Even though the projection surface of the dome screen has tripled to almost 1,000 m2, the number of seats was limited to 278, opting for a very comfortable seat size and leaving plenty of space between rows, a luxury rarely seen in planetariums.

Each seat offers complete support of the viewer's head and is angled according to its location in the amphitheatre.

The New Digital Planetarium is equipped with two advanced fulldome digital theatre systems: Sky-Skan's DigitalSky2 and Evans and Sutherland's Digistar3. Furthermore, thanks to the 15/70 film projection system installed by SimEx-Iwerks and Cinema Development Company, the New Digital Planetarium projects large format films on its dome and thus offers to its audience an even wider range of scientific and educational content.

Sky-Skan's SPICE automation system controls an extensive set of additional digital video, slide and DVD projection systems, a Laser Projection System by Laser Fantasy International, Sky-Skan's interactive control units, many special effects projectors, as well as the 40,000-watt 6.1 Digital Surround Sound System, which transmits the soundtrack of the shows through 44 special speakers.

Digital projection on the dome is achieved now through 12 Projection Design F32 projectors, arranged in two sets of six, installed and integrated by Sky-Skan in July 2009 in place of the 12 Barco 909 CRT video projectors that were originally installed in 2003 and had successfully served the theater for six seasons.

Also, all the digital systems' computers have already been replaced twice since the initial installation in order to comply with the continuing developments and rising requirements of the digital content.

Indeed, thanks to its annual upgrade of necessary software and hardware and to the production of two 40-minute digital shows per year, each complemented by fully-illustrated guidebooks that expand the main theme of each show, and due to all of its multifac-



eted science and technology dissemination activities, the New Digital Planetarium deservedly belongs to the Ivy League of planetariums worldwide.

Show production

In order to have as much control as possible on the outcome of each planetarium production and, at the same time, to keep costs at an absolute minimum, new productions are made according to in-house developed scripts and music combined with ready-made

scenes leased from existing international planetarium productions.

It is mostly due to this strategy that the New Digital Planetarium succeeds in producing two 40-minutes shows per year. Lately, however, the New Digital Planetarium started pursuing the development of some scenes by collaborating with independent Greek animators, a trend that hopefully will increase in the future. To this end, various production and organisational teams have been established, which collaborate in creating the shows.

The educational team selects the main theme of each show and is responsible for all educational aspects of the production as well as its overall planning and implementation.

The creative team directs and edits all shows with the help of a fully-equipped digital production studio that processes the full-dome animation, programs the real-time scenes and creates the fulldome videos with the help of a powerful computer rendering and slicing farm.

The electronics-automation team oper-



ates in a specially equipped electronics lab that serves as the basis for all hardware repairs, modifications and improvements needed for the planetarium's smooth operation. The state-of-the-art sound studio, complete with a soundproof recording booth, is a fully-equipped recording studio in which all planetarium soundtracks are recorded.

Finally, an impressive storage farm with 50 TB of storage disk space, which is continuously expanded, is used for the safe keeping of all the data (images, videos etc.) used for the planetarium shows.

In light of the financial dire straits Greece faces right now, and indeed of the financial crisis worldwide, education itself has not been left unscathed.

Nevertheless, the New Digital Planetarium, in close collaboration with the other departments of the Eugenides Foundation, namely Interactive Exhibits, the Publishing Department, the Conference Center and the Library, continues in these difficult times to honor the Foundation's mission.

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When ingenuity was king:

Seymour Planetarium celebrates 75th anniversary



Frank Korkosz stands behind the Seymour Planetarium's original control console, made from a roll-top desk, in this 1937 photograph. All photos courtesy Springfield Science Museum.

Richard Sanderson Curator of Physical Science Seymour Planetarium Springfield Science Museum Springfield, Massachusetts RSanderson@springfieldmuseums.org

Korkosz brothers defy the Great Depression to build a star projector

The Seymour Planetarium, located at the Springfield Science Museum in Massachusetts, recently celebrated its 75th anniversary. Highlighting this milestone was the museum's announcement that an asteroid has officially been named in honor of Frank and John Korkosz, the two brothers who designed and built the planetarium during the Great Depression.

Asteroid 243262 Korkosz was discovered by astronomer Luca Buzzi at the Schiaparelli Observatory in Italy and now immortalizes the achievements of these two planetarium pioneers.

On the tail of a comet

As an 8-year-old boy, Frank Korkosz followed the 1910 visit of Halley's Comet with great excitement. A couple years later, he constructed a comet projector from a wooden box, carbide lamp, and lens. Korkosz charged neighborhood youngsters a penny apiece to learn about the famous comet and watch

it drift across the ceiling of his Pennsylvania home.

The Korkosz family moved to Chicopee, Massachusetts in 1915 to work in the textile industry. Frank quickly discovered the Museum of Natural History in nearby Springfield, which today is called the Springfield Science Museum. What drew his attention to the museum? In his words, "It was my mother's kitchen stove!"

In an early display of inventive imagination, Korkosz collected clay from the bank of the Chicopee River to repair a hole in the stove and used leftover clay to make some animal figures. Noticing his artistic talent, a teacher brought him to the museum, where director Grace Pettis Johnson admired his work and offered encouragement.

Johnson eventually hired Korkosz in 1930 to work as a museum technician. During that decade, a new second floor was added and he demonstrated his mechanical ability by building a 15-tank aquarium. While working

at the museum, he took astronomy courses at Harvard University and Amherst College, but never graduated from college.

John Korkosz, Frank's younger brother, was an electrician employed by the Chicopee City Engineer. John's technical skills would soon be combined with Frank's knowledge of the heavens for an important project that would become their enduring legacy.

The legacy of the mechanical

For thousands of years, people have constructed models and mechanical devices to reproduce the night sky and display its movements.¹

A remarkable celestial computer known as the Antikythera Mechanism, built around 100 BC, was discovered by sponge divers off the coast of Greece in 1900. This sophisticated, geared instrument could calculate past and

1 For more about this history, see the June 2013 *Planetarian* and The magic of the Atwood Sphere starting on page 10.

future information about the positions of the stars, moon and five known planets.

Beautiful mechanical models of the solar system known as orreries appeared in the 18th century and could demonstrate the movements of the planets around the sun. They were named after the Earl of Orrery, who commissioned one in 1704.

Chicago's Atwood Sphere, built in 1913, reflected a movement toward greater realism in museums during the early 20th century. This rotating, 17-foot-diameter metallic sphere is perforated with 692 holes. Light shines in through these holes to create a simulated starry sky for those who venture inside.

The modern projection planetarium, introduced in 1923 by the Zeiss optical firm in Germany, represented a giant leap forward in versatility and realism.

Can't afford it? Then we'll build it

Frank read about the Zeiss planetariums that were appearing in a few of the largest American cities and he appreciated their importance as teaching tools. Of course, a midsized museum could not afford one of these mechanical marvels, especially during the Great Depression, so his only option was to build a planetarium.

The newly-added second floor of the museum included a windowless gallery which staff members had nicknamed, "The Department of Mystery." In those days, museums used windows and skylights to provide natural lighting for exhibits.

This windowless gallery therefore seemed a lot more puzzling during the 1930s than it would today, as museums now cover up their windows and use controlled artificial illumination to avoid the bleaching effect of bright natural light.

Frank proposed using this dark gallery as a planetarium theater and his boss, Grace Pettis Johnson, liked the idea. Frank enlisted the help of his brother and they soon began making sketches.

An early idea was to perforate the gallery's flat ceiling with holes depicting the familiar constellation patterns, which would be illuminated by lamps located above the ceiling, similar to the Atwood Sphere.

Then came a communication from Johnson's superior, City Library Association President Nathan D. Bill, who wrote, "...in carrying out the plan, do not carry it out in an amateurish way, make whatever you do first class even though it does cost a little more."

In response to Bill's encouraging instructions, the original concept of a static simulation of the night sky was replaced in 1933 by the dynamic universe of a projection planetarium and a sky filled with moving stars. The museum's roof would be raised to accommodate a domed ceiling.



Top: A group of visitors enjoys a show at the Seymour Planetarium, circa 1940. Right: Planetarium pioneers Frank (left) and John Korkosz visit the Seymour Planetarium in this 1984 photo taken by former planetarium educator Patrick Rowan. Today, this is the oldest operating projection planetarium in the United States.

By early 1935, Frank and John had designed the star projector and fabrication of its components had begun. Local machinists and students at Chicopee Trade School provided assistance.

Meanwhile, on the opposite side of the country, the largest telescope in the world was being built at Mount Palomar Observatory in California. During those terrible years, the seeds were planted for the greatest period of astronomical discovery and space exploration the world has ever known.

Springfield's planetarium was nearing completion in 1937. A 500-watt bulb at the center of a single 1-meter-diameter "star-ball" provides light for over 7,000 star images. The stars are created when this light passes through 41 cylindrical projection units mounted in holes that cover the star-ball.

Each projection unit contains condenser lenses, a gravity-controlled shutter to extinguish the stars at the horizon, and a thin aluminum disc punched with scores of holes to represent the star-field in a small section of the night sky. A lens then focuses the star images onto the 10.2-meter-diameter dome to create a strikingly realistic depiction of the night sky.

The Korkosz brothers equipped the 2.1-me-

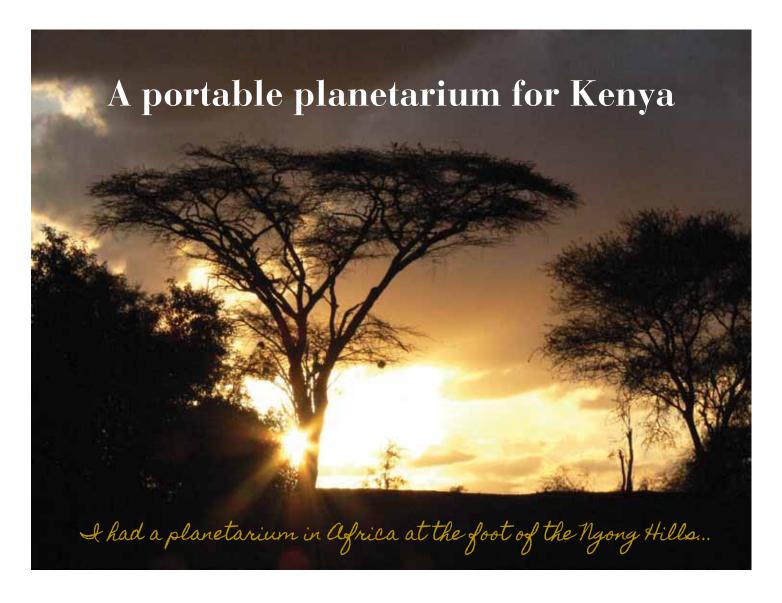
ter-tall planetarium projector with motors to simulate the Earth's rotation and revolution, precession and the shift in the celestial sphere caused by changing latitude.

The finishing touch: the planetarium was named for museum benefactor Stephen Seymour.

The public approves

Prior to the planetarium's public opening on November 2, 1937, the teachers of Springfield and Mayor Martens and members of the City Council received special previews. The Seymour Planetarium quickly became a popular destination for visitors and school class-

(Continues on Page 24)





Kyle Doane with Maasai. All images by Leslie Kadane; provided by author.

Kyle Doane NOMAD DOMES 4305 Fairfax Ave. Dallas, Texas 75205

Follow Kyle's adventures at www.facebook.com/NomadDomes

In 2006, I visited Kenya for the first time. It is an amazingly diverse place with mountains, flamingo-filled crater lakes, and an east coast along the Indian Ocean with white sand and sea turtles.

Some of the earliest known hominid fossils were found by Louis Leakey near Lake Turkana and there is some deep whisper of "home" carried on the wind.

There is much more to Kenya than just the lions, elephants, giraffe and zebra that most Westerners picture from our trips to the city zoo.

The large cities of Nairobi and Mombasa are pulsing and crammed with humans, but the vast, protected parkland such as Tsavo and the Mara stretch with windy dirt roads where baboons are far more plentiful than people. It is easy to find yourself lost in time.

Part of my trip involved visiting a Maasai community where a friend of mine, Kakuta, grew up. The community of Merrueshi is located equally distant from Nairobi and Mombasa and far away from any paved road. The closest "main" road is a dirt track which leads

to Amboseli at the foot of Mt. Kilimanjaro.

The Maasai are traditionally a nomadic people and this community was about as far away from light pollution as possible on today's planet. I was excited to record the cultural stories of a people who had used the stars to guide them for thousands of years.

A friendship begins

I met Kakuta in Seattle, where we both worked as environmental educators at Woodland Park Zoo. Kakuta had built a foundation in Seattle which raised enough money for his community to build a school so that the Maasai kids could finally be educated at home in their own culture instead of being shipped of to English-style boarding schools where they seldom thrived. Kakuta says, "A Maasai without his culture is like a zebra without his stripes."

After a couple of days getting to know the school and the community, I offered to do an astronomy night for the high school students. We gathered at the school after sunset and

(Continues on Page 18)

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Kyle Doane, continued from Page 16

shut off the school's security light, which was the only light visible on the horizon.

The Maasai call the Milky Way "The River of the Gods," and it really did seem to flow across the sky. Had this been a March sky, the Southern Cross would have been visible exactly on the opposite side of the sky's dome from the Big Dipper. On the equator, every star is a possible telescope target. In late September, Ursa Minor was barely visible sticking up from the northern horizon, her tail pinned to the Polaris somewhere just below what I could see. Cygnus swam in the river directly overhead.

I asked the kids to point out any asterisms that they knew. One student said "Orion" (which was not visible that time of year) and another pointed to Cygnus

and said "The Southern Cross." I congratulated them on knowing some asterism names and explained that they could see those in a few months. I asked if any could show me any of the Maasai asterisms. They were silent. One student said, "We haven't learned these from our elders because we have been sent off to school.

I realized then that the thousands of years of oral lineage had been broken in this generation. As the elders die, so will their stories, and so will a connection that all humans have to our collective ancestory.

The elderly night watchman said that he didn't know many stories, only the ones that "everyone knew." He began to tell the kids how to use the stars as calendar markers to predict rain (remember, the tropics have seasonal rains). The kids were amazed and promised to ask their grandparents for more stories. I promised that I would some day come back and hear their stories.

Working to fulfill a promise

For the last seven years, I've been making steps toward fulfilling that promise.

Kenya's connection to astronomy is far more than just the preservation of cultural stories. Its location on the equator with an eastern coast makes it an ideal location for both telescopes and satellite launching facilities.

Kenya has been chosen as for a node of the Square Kilometer Array, the largest radio telescope ever built, and the infrastructure that comes with participating in the SKA will have a positive economic impact on the country.

The University of Nairobi has graduated its first cadre of bachelor's degree astronomers with hopes that they could one day work on astronomy projects in Kenya. Some of these Kenyan astronomers have formed the Amateur Astronomy Society of Kenya (AASK) to inspire children to become interested in sci-

Left: An adult male giraffe, iconic of Africa. Below: Kyle's wife Leslie with a monkey; the road to Tavo; finding Bob Marley on the coast.

ence. The innovations that come with home-grown scientists can make huge strides towards eradicating poverty and bettering living conditions in the large urban slums.

Much of Kenya's current economy is from tourism. Because people travel to Kenya to see the animals, the animals are seen as valuable and are preserved. If more people came to Kenya to experience the beautiful skies, perhaps the dark skies would also be seen as something worth preserving as Kenya develops.

Over the last few years, I've been meeting with astronomy professors and informal science educators who are doing amazing work in Kenya. When the Perot Museum of Nature and Science in Dallas decided to officially retire its lower resolution Digitalis Alpha 2 portable projection system, I worked with my friends in Kenya to make a proposal to give that system new life as the first digital planetarium in Kenya (perhaps the first in East Africa).

Digitalis has kindly agreed to refurbish and upgrade the projection system.

Taking the stars to the schools

This portable digital planetarium can be set up in any school throughout Kenya. The planetarium is an inflatable dome with a projection system in the middle. Students sit inside the dome and see a simulated sky on the dome in every direction. We can show details of the night sky, including telescopic views of deep space objects (such as galaxies and star forming nebula) and planets that rotate and have moons revolving around them. We can change the perspective and land on one of these moons to look back at the Earth.

Landing on our own moon, we can show the perspective of the Earth as seen by the Apollo astronauts. From this view, Neil Arm-





strong said, "It suddenly struck me that the tiny pea, pretty and blue, was the Earth. I put up my thumb and shut one eye and my thumb blotted out the planet Earth. I didn't feel like a giant. I felt very, very small."

From this perspective, we realize that our Earth is tiny and interconnected. What happens in one part does have an effect on us all. Kenya is a diverse crossroads where Muslim, Christian, Hindu and many other traditional cultures exist side by side.

(Continues on Page 42)



Comet tales with a comet nucleus



Adam Thanz Bays Mountain Planetarium Kingsport, Tennessee thanz@kingsporttn.gov

For planetarians in general and for us at Bays Mountain in particular, it all started in June of 2012. It became clear that in order to be prepared for Comet ISON (C/2012 S1), a planetarium show along with an interactive activity would be needed to best educate the general public about comets.

Comet ISON is hoped to become easily visible to experienced observers in the fall of 2013, but be at its best in December of 2013. After six months of production, we created a high-quality, but low-cost, planetarium show titled *Comets & Discovery* for our dome and for world-wide distribution.

We also completed working models of a comet nucleus and the sun.

The general design of the models, along with the educational methods to be applied with them, were created by the author.

The physical creation of the models was by Cassandra Rose, a newly-hired part-time exhibits artist at Bays Mountain. The result was a balance of complexity needed to do the activity properly (as well as being [hopefully] child-proof) and simplicity in creation by us and by you, the reader.

General background of comets

Comets are ancient denizens of the solar system, forming with the sun and planets 4.5 billion years ago. They reside in a loose, hollow sphere located 50,000 au from the sun called the Oort Cloud, named after the Dutch astronomer Jan Oort, who postulated its existence in 1950. Due to this great distance, it is very cold, about 10 K.

They are made of mostly water and other ices along with dust and minor amounts of rock. Since so much time has passed since their formation, they experience impacts by other comet nuclei and so they are not pristine.

When one of these impacts causes a comet to come inwards towards the sun, it then embarks on a long journey that takes many thousands of years. As a comet nucleus travels

within the region of the planets, its coma develops. This is caused by the icy nucleus heating up slowly and causing the ices to melt and sublimate.

But, because the crust of the nucleus is like a hard shell, the interior ice creates small cavities and starts to bubble and boil. When the pressure inside these small cavities becomes too great, these newly-formed gasses burst out through the shell and into space. This creates a geyser on the surface of the nucleus.

If we pull away from the comet, we see these gasses form a giant cloud held by the nucleus' weak gravitational pull. This is called the coma.

When the nucleus and its coma get to the inner solar system, the coma will get large enough to leave a trail of debris. This effect stretches the coma back away from the nucleus and creates a dust tail. Meteor showers are caused by Earth traveling through these debris trails.

When the comet gets even closer to the sun, another tail may become apparent, the ion or gas tail. This is a result of the nucleus reacting to the solar wind of charged particles emanating from the sun.

As the comet progresses, the nucleus will move faster and curve around the sun.

The two tails then start to separate at an angle from each other. The dust tail always follows the nucleus in its path, like bread crumbs left on a trail. The ion tail always points away from the sun as it is directly affected by the solar wind.

What we see from Earth is dependent on the path of the comet, the direction the tails are pointing, and Earth's path around the sun.

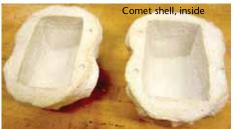
As the nucleus zips about the sun and then leaves the inner solar system, the tails can be seen pointing in very different directions, even opposite each other. A very strange sight. This activity is designed to help illustrate the above description three-dimensionally.

Educational efficacy

The comet nucleus model is designed to illustrate the path and orientation of a comet nucleus and tails as it orbits the sun. We use this model with our planetarium show, but its usefulness is unbound. Allowing students to make the models would incorporate crosscurricular skills and interests as well.

(Continues on Page 22)









Foam craft essentials





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The cost to make the models can be next to none if you can find or salvage the materials from other sources.

In a planetarium theater, place the sun model in the center of the room under or near the star projector. To maximize the educational and entertainment value of the activity with a group, ask for and select three volunteers. This activity will work well with almost any age.

The instructor will start by describing the nucleus, its composition, and that its coma will grow and stretch away from the sun as the comet approaches the sun.

When the nucleus gets close to the sun, the tails will start to form and stretch away from the sun. One volunteer will hold the nucleus model, the other two will hold the rods that are attached to the ends of the two ribbons.

The instructor will then inform the one holding the nucleus to slowly go around the sun model. The person holding the white ribbon will represent the dust tail and will be told to always follow the nucleus. The person holding the blue ribbon will represent the ion (gas) tail and will be told that the end of the tail always points away from the sun.

This is done loudly enough so the audience hears the instructions. Both of the tail volunteers will be asked to slowly pull the tails out as the nucleus first approaches the sun.

Even wrong is a teaching moment

If all works well, each person will do their job correctly and the length and orientation of the tails will be seen to stretch and splay out. If not, ask the audience what went wrong and what should be done to make it correct. With the audience's suggestions, redo the "orbiting" of the nucleus with the two tails and see if it goes well.

There are a number of educational methods applied in this activity. Since many children and adults have difficulty understanding and thinking in three dimensions (spatial reasoning), they can now see how the tails follow their own orientation in relation to the comet and sun as the comet orbits the sun.

The instructor is used only to introduce the activity, but not to be the participant. This makes for an active learning environment instead of a passive one. Even if a person



The completed models in our planetarium theater with Bays Mountain artist Cassandra Rose. All photos courtesy Bays Mountain Planetarium

is still sitting in the audience, they see one of their peers (another audience member) be involved. Those that are literally part of the activity (one of the three volunteers) receive not only hands-on instruction, but are also part of making science fun, which helps alleviate science phobia.

If the audience is asked to state what may have gone wrong in the first try, then they are being active participants. They are using reasoning skills to evaluate the situation.

We think that you'll have lots of fun with this activity. Your school groups and public program attendees will both enjoy and learn.

Basic construction method

The comet nucleus model is designed to be constructed easily and use common materials. The basic construct is that the model is made of a stiff foam and that it has two chambers to hold the two ribbons.

The sun model mentioned is very simple: simply a foam ball that is painted to look like the sun.

For the comet model itself, find or purchase stiff Styrofoam. The model is made in two halves, so depending on how large you want

the nucleus, you might be able to find two pieces from the packaging of something large, like a TV or computer.

Carve the foam with sculpting tools and rasps to make the nucleus lumpy, and add craters. Carve out two chambers for the ribbon, small holes to hold very strong magnets, and places for two hinges. This will allow you to open the model up and retract the ribbon.

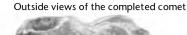
The magnets hold the two halves together. They should be strong enough to keep a child from opening up the model, but not so strong that you cannot open it. A Dremel tool is very useful in the small carving.

This next step is the only part that is special. We used a 1:1 mix of Bounce and Foam Coat. This protects, hardens, and provides a resilient and sandable surface. You can purchase this from www.hotwirefoamfactory.com.

The more coats, the stronger the surface. Remember, you're probably going to be using this many, many times with lots of kids and the public. It will be dropped and banged

Add the magnets and screw in the hinges, then coat both the inside and out with (Continues on Page 24)







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Comet model, continued from Page 22

the mix. You may need to add a second coat on top of the hinge for structural stiffness. I would recommend using some scrap foam to experiment with the mix before applying to the final model.

The simplest design is one that uses no spooling mechanism and the ribbons are just packed into their own chamber with a small opening for the ribbon to pull out. The opening can be finely Dremeled out after the coating is dry.

You want some tension on the ribbon so it doesn't flow out easily; we used a small piece of rubber base board with a thin slit in it.

Two chambers, two tails

You also want two separate chambers so the ribbons can come out at different rates and don't get tangled up with each other.

The best material for the ribbon is a thin, ripstop nylon material, like what kites and sails are made from. They don't fray and are resistant to knotting up.

At the start of the ribbon, we have rings and a small clamp to attach a 2.5-in (0.75-m) rod. This lets us hold the end of the ribbon out over the audience, since our walkway is not wide enough for us to be at the end of the 6-ft (1.8-m) ribbons.

If you want to go to the next step of complexity, you can make mechanisms that hold the ribbons on a spool. This requires a small wooden frame that holds two pieces of dowel. One dowel is non-rotating and provides a

way to stiffen the frame. The other dowel spins and the ribbon is attached to it.

When we're done with the activity, we open the model and hand-spin the dowels to wind back each ribbon.

If you want to be fancy, you could use a retracting mechanism, or you could design a rig that would allow a key (like a hex key or allen wrench) to be inserted to wind the spool after use.

Once the physical model is done and working well, paint the nucleus very dark and mottled. Comet nuclei have a low albedo (reflectivity). A charcoal base coat was used with a black wash to darken the craters and a slightly lighter gray for highlights.

The complete plans with detailed steps and accompanying photographs are available for free for both the comet nucleus and sun at www.baysmountain.com/planetarium-productions/comets-discovery-full-dome. Just click on the tab for "Activity Documents."

The comet model and its activity was first demonstrated at the 2013 SEPA conference in June 2013, and also has been published in the SEPA journal *Southern Skies*.

Korkosz brothers, continued from Page 15

es from all across New England, as it remains today.

In addition to the four Zeiss planetariums on American soil at that time, located in Chicago, Philadelphia, Los Angeles and New York City, the first American-made projection planetarium had opened its doors in 1936 at the Rosicrucian Egyptian Museum in San Jose, California.

The Seymour Planetarium, therefore, was the sixth projection planetarium in the United States, but since all five earlier installations have been replaced by newer models, Springfield's is now the nation's oldest operating projection planetarium.

Against the backdrop of the planetarium's firmament, Frank taught tens of thousands of visitors about the night sky. He also became a popular local spokesperson about topics relating to astronomy and space exploration.

Frank ascended to the directorship of the Springfield Science Museum in 1958 just after he and John had built their second and last planetarium, this time for Boston's Museum of Science.

In 1964, he received an honorary doctor of science degree from Western New England College in Springfield. In the meantime, John was promoted to manager at the Chicopee Electric Light Department.

Frank directed the Science Museum until his retirement, after 45 years of service, in 1974. He died at age 84 in 1987, the planetarium's golden anniversary year. John passed away at age 89 in 1994.

Early American planetariums transformed astronomy education and elevated public interest in astronomy during the 1930s. They also helped inspire the generation that would eventually send the first human beings into space and to the surface of the moon, events that changed the world forever. In that context, these instruments are priceless artifacts in the history of astronomy. The Seymour Planetarium, which is still a vibrant educational tool, is living history.

As asteroid 243262 Korkosz silently follows its nearly circular orbit 250 million miles from the sun, educators in the Seymour Planetarium lead visitors on imaginary voyages through the universe, as they have done for 75 years. Through their planetariums, the Korkosz brothers have touched millions of lives and undoubtedly have inspired young visitors to devote their lives to science.

Richard Sanderson was hired by Frank Korkosz at age 15 to present shows in the Seymour Planetarium. Sanderson is now Curator of Physical Science at the Springfield (Massachusetts) Science Museum, where he directs the Seymour Planetarium.

Undaunted, continued from Page 6

that led to some of the world's most precise optical instruments.

And it was to Brashear that two scientists at what would become Case Western Reserve University in Cleveland, Ohio, came for instruments to measure, and then disprove, the existence of "aether" and open the way for major advancements in physics and astrophysics. The interferometry experiment by Albert Michelson and Edward Morley relied heavily on the quality of their equipment, the accuracy of which was never called into doubt.

Brashear, whose legacy in Pittsburgh continues today, never left the city. Langley was offered a position he couldn't refuse: secretary of the Smithsonian Institution, basically making him the top scientist in the nation. Brashear's remains, along with those of his beloved wife, Phoebe, are interred in a crypt below the Keeler Telescope at the observatory. Also there are the remains of another observatory director, James Keeler.

Keeler continued his observation of Saturn's rings started at the Lick Observatory, and while at Allegheny used spectroscopy to confirm, through Doppler shifts, that the rings were not solid but composed of countless small objects.

These are simply the highlights of movie, which deftly entwines history, current commentary, beautiful cinematography, and solid astronomy into a gorgeous whole.

The film was Handley's idea; his vision was (wisely) supported by every major foundation in the Pittsburgh area. Narration is by David Conrad, and music by Scott Michael Burns. For more information and the trailer, visit the movie's website at www.undauntedthemovie.com. It can be purchased there, or through amazon.com or WQED (Pittsburgh public television) at www.shopwqed.org.

I would recommend *Undaunted* highly for classroom teachers, especially as a tie-in to recent fulldome programs dealing with flight; for our audiences, whose attendance indicates an interest in lifelong learning; and for every planetarian who enjoys beautiful experiences about our history.

And, also, for planetarians who need an example of how to do it right. \Leftrightarrow



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IMERSA News

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Earth science titles enrich the fulldome content library

Earth is ready for her close-up. With the availability of ever more detailed material and information captured through satellites, coupled with the ability to exhibit said material ever more effectively in the digital dome environment, the full-

dome content library continues to evolve and diversi-Astronand omy space science titles have been by joined about shows Earth science, heliophysics, weather patterns and more.

The art of data visualization has empowered new genres of education and entertainment for the dome, and Earth science is one of the expanding categories.

"I would venture to say that Earth science is probably the second biggest genre in the fulldome medium right now," says Mike Bruno of Spitz Creative Media, which has been involved in originating several successful Earth science fulldome productions, including the *Zula Patrol* series, *Dynamic Earth* and *Supervolcanoes*.

Other shows include Wildest Weather in the Solar System (National Geographic Cinema Ventures), Earthquake: Evidence of a Restless Planet and Life: A Cosmic Story (California Academy of Sciences) and Kenji Williams's live traveling production Bella Gaia. Evans & Sutherland contributions include its numer-

ous giant screen film conversions, such as Forces of Nature, Tornado Alley and Wild Ocean.

Dario Tiveron, managing director of the Fulldome Data Base (fddb.org), comments, "There's clearly a trend of pushing the limits beyond astronomy and venturing toward other subjects, and Earth science is a hot topic. A lot of attention is being paid to climate and environmental stories, with recently released shows such as *Energy for Life* (Planetario de Pamplona), *The Earth and Me* (The Animonautes & Eugenides Foundation), *The H2O Cycle* (Sliced Tomato Productions) and others in production, such as *Climate Change—What Future Are We Facing* (Albedo Fulldome). Domes seem to be the perfect place to teach students how to

Earth science shows can add variety to programming and educational options, extend-

respect the amazing planet we all live on."

ing a planetarium's scope. For institutions primarily focused on environmental and Earth sciences, the digital dome becomes an Earth science theater: examples include Our Dynamic Earth (Edinburgh, Scotland); the Environmental Sciences Magnet School at Mary Hooker (Hartford, Connecticut, USA); and the Earth & Space Science Laboratory adjoining Lincoln Elementary (Frederick, Maryland, USA), host venue of the 2013 MAPS (Middle Atlantic Planetarium Society) conference.

NASA's treasure trove of imagery

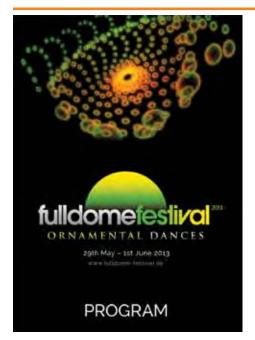
In Greenbelt, Maryland, NASA Goddard Space Flight Center Executive Producer Wade Sisler is a science visualization specialist who helps his group collaborate with media producers and institutions and tap into NASA's rich image resources and the expertise of its scientists.

His work is tied to the organization's education and public outreach (EPO) activities and ranges beyond core astronomy into such areas as astrophysics, space weather, climate change, severe storms, and the ozone layer.

"All that science is part of our storytelling charter," he says. "We're trying to make invisible things visible: processes humans have not been able to perceive before; patterns of nature"

A photographer and journalist by training, Sisler has been with NASA since 1983. He helped form some of NASA's filming agreements with IMAX and became acquainted with the work of relevant science journalists and fulldome pioneers such as Carter Emmart and Thomas Lucas.

"We have been part of the fulldome community for a while now," he says, pointing out that NASA was a sponsor of *Cosmic Collisions* (American Museum of Natural His-(Continues on Page 28)



Jena: FullDome Festival draws filmmakers, students, and artisans from around the globe

The 7th annual FullDome Festival took place May 29-June 1 at the Jena-Zeiss Planetarium (Jena, Germany). The festival organizing team was led by fulldomer Micky Remann, who also organizes the Liquid Sound festival that combines the delights of the hot tub and spa with music and immersive imagery (see upcoming events, below).

IMERSA board members Michael Daut of Evans & Sutherland and Ryan Wyatt of the California Academy of Sciences attended the festival. Daut reported that the event was very well run, with a full schedule of events, numerous workshops on production and workflow, and some networking opportunities.

The complete program can be referenced online at fulldome-festival.de/wp-content/up-loads/2013/05/FDFprogrammheft2013WEB1.pdf.

The festival was attended by mostly filmmakers, students, and artists from the US and Europe, and this was reflected in the film entries, with many from German universities and from students at the Ringling College of Art and Design (Sarasota, Florida USA); the variety of participation is also reflected in the honoree lists (see sidebar).

Some theater representatives were among the delegates as well, as were some major system suppliers, including Zeiss, Sky-Skan, and E&S. IMERSA's Dan Neafus, of the Gates Planetarium at the Denver Museum of Nature & Science, gave a presentation on "the language of fulldome," transmitted live via Skype from Denver. (Continues on Page 32)

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tory). He's been with Goddard since the late 1990s, "just when we were entering the next phase of data visualization, which has come into its own in the past decade."

In addition to a wealth of images and data, Goddard has human production resources. "Our big partners, the Science Visualization Studio here, are staffed by geniuses able to take in multiple types of data and combine them in ways that result in absolutely compelling

images. We have a coral reef of vibrant science storytellers, filmmakers and writers," says Sisler, whose job includes supporting NA-SA's web team, video TV team, visualization team and animation team.

"Scientists here think of an idea, design instruments to record data, design spacecraft and test and launch it," says Sisler. "Communicators we work with here complete that circle, and try to share that with the widest possible audience."

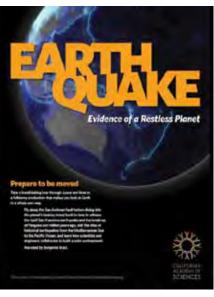
"Every time we turn over a rock here at NASA Goddard, there are five stories waiting to be told," says Sisler. "We have rain radar now. We have 3D scans of tropical storms and rain events. It would be a fantastic show to see lightning from space as it happens, and observe the patterns. 98% of lightning is over land; only 2% is over the oceans. Planetariums are a great venue for this kind of material because of the immersive environment, the enormous sense of scale, and the way the information is presented."

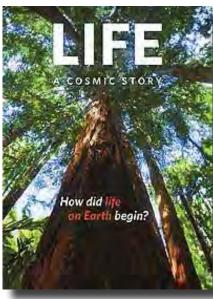
Goddard welcomes inquiries and visits from producers. "We take them to our screening room 'hyperwall' and watch their jaws drop when they see the enormous resolution and images there," says Sisler.

"Then we bring in scientists, animators, and visualizers and kick around ideas. If the stars are in alignment, then we move toward trying to make it happen financially."

He adds, "The most rewarding relationships happen at the early stages of a project. We contributed about one third of the content in Dynamic Earth. By building on the shoulders of our earlier visualization work, we helped keep down expenses. It was a good working collaboration."

Just as NASA has expanded from rocket science to Earth science, planetariums are not just for astronomy anymore.





"Our scientists point out that the instruments we use to study the atmosphere of other planets are essential in studying our own as well," remarks Sisler. "We're learning how everything fits together as a system: land, ocean, atmosphere, all working together in very complex interrelationships, using NASA's computing power and observational power as a natural extension of what we do as we explore the solar system."

California Academy brings planetariums down to Earth

"As I like to express it, we want to put the 'planet' back in 'planetarium," says Ryan Wyatt, director of Morrison Planetarium and Science Visualization at the California Academy of Sciences (San Francisco).

With a focus on biology, climate, and geology that supports the Academy's research domains, Morrison Planetarium's fulldome productions have tapped into research centers around the Bay Area as well as the region's sizable visual effects community. "Not only are we revealing Earth in a new way, we're creating more photorealistic environments that put people in familiar places—standing on the California coast as opposed to the surface of Titan."

Collaborators on *Life: A Cosmic Story* included the NASA Astrobiology Institute (Moffet Field, California) and the SETI Institute (Mountain View, California), but to find the data to illustrate events in *Earthquake: Evidence of a Restless Planet*, Wyatt notes, "we had to reach much farther afield." To visualize San Francisco's infamous 1906 temblor, the Academy turned to Lawrence Livermore National Laboratory (Livermore, California) for supercomputer simulations and volumetric datasets of Earth's interior.

"The amazing researchers at Lawrence

Livermore were true collaborators: when they weren't visiting us, we were on the phone constantly throughout the production process, making sure we got the science right." The United States Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), and the University of California-Berkeley also provided data used in the production.

"We took the added step of integrating these data into real-world environments," explains Wyatt, "so the 1906 supercomputer simulation data is revealed after we experience the earthquake from street-level, in an historically

accurate recreation of what downtown San Francisco looked like at the time. Connecting our audiences with the sense of being rooted in the real world gives added meaning to the science story."

Wyatt believes that the combination of these tools—the realistic depiction of the natural world plus the integration of science visualization—is one of the unique, distinguishing features of content produced by the Academy. "I think that's part of the reason *Earthquake* was the first fulldome feature to be nominated for a Visual Effects Society Outstanding Achievement award."

He goes on to point out that Morrison Planetarium presenters also use real-time Earth data with each showing of *Earthquake*. "Prerendered is only part of the story," he says. "We also make use of WorldWide Telescope or Uniview to reveal the locations of earthquakes that have taken place in the last 30 days. Our presenters provide context for those events, which underscores the idea that earthquakes are happening all the time, all around the world."

Once a month, the Academy also highlights work of its researchers alongside current events in Earth systems during its adults-only NightLife event, in a program called Earth Update. "Instead of a tour of the universe, it's more like a tour of the planet," says Wyatt. "And it gives people the perspective to think differently about our rapidly-changing world."

Embracing Earth science in fulldome looks to be part of a general trend to diversify the types of content they show. The increasing number of titles being cross-platformed from giant screen to fulldome and covering a range of topics, including Earth science and natural history, also support this trend.

National Geographic's Sea Monsters, distributed in fulldome by Sky-Skan and E&S, is one (Continues on Page 30) The moment of inspiration when he decides to fly to Mars one day.

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Inspirations for visitors of the refurbished Laupheim Planetarium, a powerdome® Sky Theater comprising the latest SKYMASTER ZKP 4 and VELVET Duo hybrid system.



successful example. While this broadens the appeal of a fulldome theater to a much wider audience with more varied interests, some voice concern that it may also create confusion among a core planetarium audience that is expecting to see an astronomy show

It will be interesting to see how theaters meet this challenge in terms of marketing and branding, and how the trend evolves over the next few years.

Everyone wants to fly

Dream to Fly, the first fulldome release from the Copernicus Science Center in Warsaw, Poland, was an audience and jury favorite at the Jena FullDome festival, where it had its industry premiere. It had previewed in a short clip at the IMER-SA Summit 2013.

Daut praised it highly: "Dream to Fly hit all the right notes story-wise, script-wise, and in terms of understanding how the visual space of the dome works. It has the right balance of dialog to imagery. It combines a little whimsy with beautiful visualizations depicting hot air balloons, World War II battle sequences, the history of flight and develop-



ment of air travel. *Dream to Fly* has an elegant, timeless quality with the caliber of a signature film."

Dream to Fly was created under the direction of Maciej Ligowski, deputy head and show producer of The Heavens of Copernicus Planetarium at the

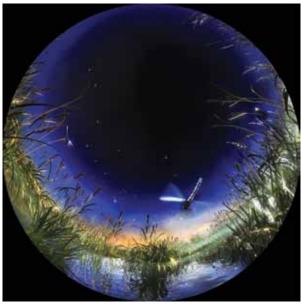
Copernicus Science Center since 2009. He summarizes *Dream to Fly* as being "about how the dream was born and how it came true. We are trying to show the whole story in a poetic way from the human perspective. The ultimate message is 'never stop dreaming.'"

He regards it as an "animated film—not an astronomy show—making the best possible use of camera movement and the dome environment to create visual interest."

The facility has made a serious investment in show production, including a high-capacity render farm. It also produces its own content, with Weronika Śliwa overseeing creation of real-time shows and Ligowski in charge of fulldome shows.

A custom, in-house, real-time 3D program, *Life 3D*, explores the possibility of life in space and engages visitors in the storytelling.

The planetarium also programs third-party shows such as We Are Astronomers (NSC Cre-



Still image from $\ensuremath{\textit{Dream}}$ to $\ensuremath{\textit{Fly}}.$ Courtesy Heavens of Copernicus Planetarium

ative), *Natural Selection 3D* and *Dawn of the Space Age 3D* (Mirage3D), and *Secrets of the Sun* (Evans & Sutherland).

"We can learn a great deal from media producers experienced in the world of animation, whether or not they have worked in full-dome," said Ligowski.

With a background in multimedia technology, lighting design, and semiconductors, Ligowski found that the planetarium opportunity suited his love of science and his technical and design skills.

He was brought on board before the facility opened, but after construction was already underway. He chose the fulldome projection system, wrote a substantial portion of the tender, and worked with architects to integrate the planetarium into the design of the building.

The science center opened in November 2010, and in June 2011, The Heavens of Copernicus planetarium followed suit, unveiling a 140-seat, 16-m fulldome theater with a 17-degree tilt, outfitted with a hybrid system combining Sky-Skan definiti 3D stereoscopic vid-

eo projection with lasers and a Megastar IIA projector. Visitors don Infitec glasses to view 3D shows.

The science center currently draws about 1 million visitors annually, and in 2012, about 25% of them visited the planetarium.

Upcoming events

'Imiloa Fulldome Film Festival. September 5-7, 2013, 'Imiloa Astronomy Center at the University of Hawaii, Hilo, Hawaii. www.imiloahawaii.org/168/

GSCA International Conference & Trade Show. September 14-17, 2013, Ottawa, Ontario, Canada. www.gi-antscreencinema.com

Jackson Hole Wildlife Film Festival (will include fulldome presentations). September 23-27, Moran, Wyoming. www.jhfestival.org

Themed Entertainment Association (TEA) SATE '13 Experience Design Conference. October 3-4, Savannah College of Art & Design (SCAD), Savannah, Georgia. www.teaconnect. org

Association of Science-Technology Centers (ASTC), Annual Conference, Oct 13-16, 2013, Albuquerque, New Mexico. www.astc.org

Reflections of the Universe full-dome festival, October 21-21 2013,

Tereshkova Cultural and Educational Center, Yaroslavl, Russia. Organizers: Andrey Lobanov and Yaroslav Gubchenko. en.fulldomefilm.org/festival2013.html

Liquid Sound Festival 2013, Bad Sulza, Germany, Mixed media conference, November 2; Festival, November 8-10. Media, music and spa culture come together under the leadership of Micky Remann. www.liquidsound.com

Fulldome LA, Vortex Dome, Los Angeles, California. December 6-7, sessions and screenings organized by Kate McCallum and presented by c3: Center for Conscious Creativity in association with Vortex Immersion, IMERSA and the Millennium Project. www.consciouscreativity.com

IMERSA Summit 2014, March 6-9, Denver Museum of Nature & Science, Denver, Colorado. Volunteer organizers and general proposals are invited. Contact info@imersa.org, www.imersa.org

FullDome Festival 2014, Jena, Germany, May 22-24, 2014. Theme: "A Head in the Curve." www.fulldome-festival.de



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- Carolyn Collins Petersen, Loch Ness Productions

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Jena FullDome Festival, continued from Page 26

"Judging from the strength of what was presented, especially the student work, the full-dome industry is really taking hold, and its future is bright," said Daut. "Of course it is so in the hearts of people already committed to it and doing it for a living—but at Jena, you could see students' passion about it, too. Full-dome is capturing imaginations. The students had some tricks up their sleeves that we pros could learn from," added Daut.

Creativity, passion and hard work were formally recognized in the juried FullDome Awards (see sidebar), an impressive presentation of honors delivered with unique fanfare befitting the "Ornamental Dances" theme of the meeting.

Each awardee was greeted by a pair of dancers bestowing the Janus trophy and other honors as they twirled to an instrumental theme, appearing in several changes of costume throughout the evening. (Janus is the Roman God with eyes in the front and back, "for optimal fulldome viewing" as Remann is fond of pointing out).

In addition to receiving a trophy, several honorees received cash and other prizes from a range of sponsor-donors. The California Academy of Sciences sponsored the First Year Students' Award to give incentive to junior contributors to the festival.

FullDome Festival 2013 Winners The lanus Awardees

- First Year Students' Award: Millivette González-De Jesús, Ringling College of Art and Design, Florida, for the first semester student contribution The Dreamer
- Creative Award: Min-Kyung Ko, Hochschule für Gestaltung Offenbach Sounddesign: Felix Deufel, Yannick Hofmann, Hochschule Darmstadt, for the student contribution Bon Voyage
- Performance Award: Jochen Isensee, Hochschule für Bildende Künste Braunschweig, for the student contribution Schrödinger's Birds
- Audience Award: Karim Eich/Livius Pápay, Bauhaus Universität Weimar, for the student contribution In the Name of the King
- Didactic Dome Award: Julia Wiesner, Fachhochschule Potsdam, for the student contribution The Five-Step Model of Vilém Flusser
- Emphasis on Emotion Award: Daniel Weik/Moritz Degen, Fachhochschule Potsdam, for the short film Von Furcht und Freiheit (On Fear and Freedom)
- Spatial Sound Award, Aaron Bradbury, NSC Creative, for the short film VORTEX with Spatial Sound Wave soundtrack
- Innovative FullDome Production Award: Robin Sip, Mirage 3D, for the full-length feature show Dinosaurs at Dusk
- Directors Award: Maciej Ligowski, Copernicus Science Centre, Warsaw, for the full-length feature show Dream To Fly

The Spatial Sound Recognition Awardees:

- Peter Popp, Softmachine, Munich, for the fulllength feature show The Life of Trees
- Planetarium Hamburg & bluphasemedia for the short film Precious Life
- Felix Deufel, Yannick Hofmann, Natascha Rehberg,



Artists of the dance duo Vainno ceremonially hand over the Janus for the Audience Award to Karim Eich and Livius Pápay. Courtesy of Andrea Ludwig.

Klaus Schüller, Soundscape & Environmental Media Lab, Hochschule Darmstadt, for the student contribution I, Water

Honorable Mentions:

- NSC Creative for Cell! Cell! Cell!
- Rocco Helmchen/Johannes Kraas for Chaos and Order
- Parque de las Ciencias, Granada, for Escher's Universe
- California Academy of Sciences for Earthquake: Evidence of a Restless Planet
- Mariano Hernandez Rodilana for the full-length feature show Leo
- Loch Ness Productions for Losing the Dark
- Société des arts technologiques for Six Mil Antennas
- Spitz Creative Media, Mirage 3D and Thomas Lucas Productions for Supervolcanoes
- Ralph Heinsohn for Syncode 360
- Softmachine for The Life of Trees
- UNC Morehead Planetarium and Science Center for The Longest Night
- Sky-Skan in association with the Franklin Institute for To Space and Back

The FullDome Festival Finalists:

- Friendship, short film by Toby Norman-Wright and Chris Vandyke, Encompass 360 Degree Digital Dance
- Guardian Angel, student contributen by Jeffrey Boos, Ringling College of Art and Design
- Led Zeppelin, short reel by Mike Murray and David Merrel, Clark Planetarium
- Losing the Dark, short Film by Loch Ness Productions
- Mnemnesia Visual Music Trailer, student contribution by Florian Breuer, Sascha Schienmann, Roland Nebe, Robert Schumann Hochschule Düsseldorf
- Shark Attack, short Film by Emma Wolf and Diego de Anna
- Striare, student contribution by Christina Chang, Ringling College of Art and De-sign
- Syncode 360, short Film by Ralph Heinsohn
- The Hollow Earth of Edmund Halley, student contribution by Gentian Begolli, Bauhaus Universität Weimar
- Venatio, student contribution by Oliver Reichert, Hochschule Anhalt Dessau
- Waltz of the Ocean, student contribution by Anne-Marie Stöter, Hochschule Anhalt Dessau
 Audience choices for the top ten student clips:

- The Five-Step Model of Vilém Flusser, Julia Wiesner, Potsdam University of Applied Sciences
- Schrödinger's Birds, Jochen Isensee, Braunschweig University of Art
- 3. Jungle Cabaret, M. Mey Khammas, Potsdam University of Applied Sciences
- In the Name of the King, Karim Eich, Livius Pápay, Bauhaus University Weimar
- Mnemnesia-Visual Music Trailer, Florian Breuer, Sascha Schiemann, Roland Nebe, Robert Schumann University, Düsseldorf
- 6. Bon Voyage, Min-Kyung Ko, Offenbach University of Art and Design
- 7. The Hollow Earth of Edmund Halley, Gentian Begolli, Bauhaus University, Weimar
- 8. Home, Maadh Kalbani, Birmingham City University
- 9. Habitat I, Sönke Hahn, Katarina Sengstaken, Bauhaus University Weimar
- 10. Waltz of the Ocean, Anne-Marie Stöter, University Anhalt-Dessau

Audience choices for the top ten short films and clips overall:

- Von Furcht und Freiheit, Daniel Weik und Moritz Degen, Potsdam University of Applied Sciences
 Miracle of Life, NSC Creative
- 3. Jazz from the Matrix #42, Stefan Berke, Jan Zehn
- 4. White Room 02B3, Roddenberry Entertainment
- 5. Shark Attack, Emma Wolf/Diego de Anna
- 6. Syncode 360, Ralph Heinsohn
- 7. Relentless Night, Sky-Skan
- 8. Losing the Dark, Loch Ness Productions
- 9. Little ABC: The Light, Ilusa Media
- 10. Precious Life, Hamburg Planetarium and bluphase-

Audience choices for top ten full-length shows:

- 1. Dream to Fly, Copernicus Science Centre, Warsaw
- 2. Cell! Cell! NSC Creative
- 3. We Are Aliens! NSC Creative
- 4. Chaos and Order, Rocco Helmchen & Johannes Kraas
- 5. Ancient Skies, Ancient Mysteries, Evans & Sutherland
- 6. Earthquake: Evidence of a Restless Planet, California Academy of Sciences
- 7. The Life of Trees, Softmachine
- 8. Escher's Universe, Parque de las Ciencias, Granada
- The Longest Night, Morehead Planetarium, Chapel Hill
- 10. Moons: Worlds of Mystery, Hayden Planetarium, Boston ☆

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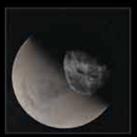
Improved atmosphere



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President's Message, continued from Page34

China and experience the hospitality of Beijing Planetarium. Along with IPS 2012 host Jon Elvert, I had the privilege of visiting the site in Beijing just a few weeks ago as I write this, and I can tell that you that Dr. Jin Zhu and his wonderful team in Bejing are great hosts and ready to welcome you.

What I experienced in Beijing was indeed most impressive. From the moment of arrival at the beautiful new airport onwards I felt safe, comfortable and was surprised how many people spoke English. It was much easier to get around than I thought and people were very friendly and welcoming.

The conference hotel is in walking distance from Beijing Planetarium, where most of the conference activities will take place. Only the business meeting will be at the hotel itself.

A physical symbol for the envisioned conference theme of "The Future of Education Under the Dome" the outstanding ensemble of Beijing Planetarium combines a classic-style planetarium with a futuristic multi-theater building complex.

Both large dome theaters will be made available exclusively for the conference all week. This allows for enough dome time not just for vendor demonstrations using immersive technologies, but also for presentations by planetarium educators from around the world highlighting best practice examples in teaching under the dome.

In addition to these large domes, there is a 200-seat, 180-degree "panoramic theater," a 4D theater and several other venues, exhibit areas and meeting rooms which allow for all types of sessions and social interactions during our conference.

Working out the details

The exhibition area will be set up in a separate and temporary structure adjacent to the planetarium. During our site visit we discussed with our host and representatives of several major vendors many details, terms and conditions for bringing projectors and other items into China and setting them up onsite.

Clearly outlining the procedures and boundary conditions both for large and small vendors is what is vital to make this endeavor work.

As I am writing this message, the resulting brochure with the respective information is being sent to all vendors.

We can expect probably 100 participants from China alone and hopefully a lot of others from the Asian-Pacific region. Our host assured us that there will be service for Chinese-English and English-Chinese translation during our sessions and in the vendor area.

This will be important and especially interesting, because one highlight and focus of IPS

2014 will be cultural astronomy, with Asian and Chinese astronomy being of particular interest. For example, did you know that there are 800 constellations and several different zodiacs?

Even outside of the planetarium and the old historic observatory, there is so much to see in Beijing alone which can be connected to our field. You should not miss the Forbidden City with its breathtaking layout, size and astronomical significance, and there is so much more.

Today's interest of Chinese families and kids in exploring and learning about space technologies and science is most impressive. We witnessed that when Dr. Jin Zhu took us to a science week festival with thousands of people engaged in activities.

Thus, we are exploring options for having also a lecture or event for the public as part of our conference and possibly Chinese astronauts (Taikonauts) as keynote speakers along with representative from major astronomy and space science projects in the Pacific.

There will be fascinating options for preand post-conference tours, which will include the amazing Science Center in Macao with its record-breaking 8k 3D planetarium, and the Hong Kong Science Center/Planetarium with wonderful exhibit areas devoted to international space flight and astronomy, plus the amazing astropark with observatory located at an UNESCO heritage site/geopark.

Our hosts will be providing letters of invitation ahead of time for those who need to apply for visa. Please check with your travel agent or the embassy early on to find out what you may need. The conference website will also give you the latest information.

Details will be posted online soon and included in a September/October mailing to all IPS members. If you have any questions, please do not hesitate and contact me or my fellow officers.

IPS Committees

Two new ad hoc committees which I recently launched are now active and will serve our community.

The mission of the Science and Data Visu-

alization Task Force, chaired by Dr. Mark SubbaRao, is to streamline the process of going from data to dome, increasing the potential for scientific communication and storytelling in the planetarium. The task force will undertake initiatives aimed at:

- Preparing planetariums for the massive stream of data that will come from next generation telescopes, satellites, experiments and computational simulations.
- Creating professional development opportunities aimed at developing more "data savvy" planetarians.
- Developing and promoting best practices for data visualization in the dome.
- Encouraging the visualization of a wide range of scientific data in the dome (moving beyond astronomy).
- Advocating for the inclusion of dome visualization tools in standard scientific analysis and visualization packages.
- Encouraging planetariums to make their facilities available to researchers from their communities to use as a visualization tool.

Mark's international team will include such major players from the field of "big data" as NAOJ and ESO. Please visit the website of the committee for contact information and more. He is planning to give some more insights into the mission in the December issue of our journal.

With great pleasure I can also announce the new IPS Planetarium Design and Operation Committee, chaired by Ian McLennan.

Ian will give our "So You Want to Build a Planetarium" guideline an overhaul and make significant updates in the form of a living web document. In doing so, he will make clear that staffing and operation planning in any planetarium project needs to be a prime focus early on.

Both committees will run sessions at the conference in 2014.

All this adds to a busy schedule, not just for me but for the whole group of officers and volunteers in IPS. I hope to meet as many as possible of you in person during one of the upcoming regional meetings and at fulldome festivals at Imiloa, Japan or Russia.

As always, onwards and upwards!

PARTYcles Alex Cherman All electrons are Who is Othello? It's a classic all right! indistinguishable. Really?!? You I will never be Which we are not! don't know your Shakespeare?!? sure if you are really you! MacBeth? Hamlet? For us quantum beings Always in doubt it is more like. To be or not to be?" about my partner. How can you NOT To be AND not to be know that?!? Poor you! You are a I hate it when he regular Othello. It's a CLASSIC!!! tries to be funny.



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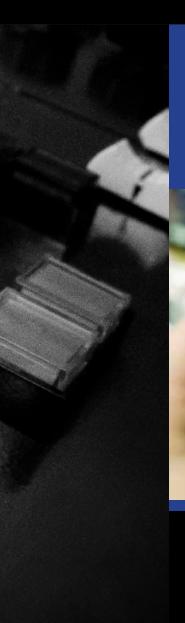




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TOSPACE March 18

Space Exploration Shaping Your Life





Museum exterior; note the Big Dipper on the exterior wall behind the president's head. Photo by the author.



Hoover-Price Planetarium
William McKinley Presidential
Library and Museum
800 McKinley Monument Drive NW
Canton, Ohio USA 44708



Dave Richards

Dave Richards Planetrium Director

In a recent Dome-L discussion on the "fulldome vs. optomechanical" question, I shared my story about the influence of planetariums on my life and how I entered the field to become director of the Hoover-Price Planetarium, located at the McKinley Presidential Library and Museum in Canton, Ohio. Yes, at a presidential library.

I started out in astronomy at age

14 by grinding and mounting my own 6" mirror. Right out of university I became a social worker and college educator, my career for the next 30 years, probably because it was right after the 1960s and I had become radicalized. (Still am.)

After three years as a protective services worker, I was fortunate enough to engage in a mission to explain the hideous social welfare system to the public and in the classroom. I acted as an advocate for the poor, chaired way too many boards and committees, loved the people I worked with (the poor, not the bureaucrats) and, finally, after laboring alongside too many public servants that were anything but, I decided to retire at age 50.

Throughout, I maintained my interest in astronomy and cosmology.

Then, about 14 years ago, I visited the local McKinley Museum of Science and Industry that had been constructed in 1963 adjacent to the McKinley Monument in Canton, Ohio. (In 2003 the museum was rechristened the McKinley Presidential Library & Museum.)

A serendipitous discovery

I had the wonderfully serendipitous discovery of their small 65-seat planetarium under a 7-m dome and flashed back to that unforgettable experience of the old awe-inspiring Zeiss at Buhl Planetarium in Pittsburgh in third grade.

I figured I could do a passable presentation, so immediately sought out the museum director and asked if they needed another presenter. After about six weeks of training on the original 1964 Spitz A3P with about 250 switches for 60 some pro-

jectors, I began doing presentations.

Within about 6 months I was asked to become director of the planetarium, as the previous director had been ill for quite some time. It took me about 2-3 picoseconds to say "Yes." I figured that explaining the universe could be no more difficult than explaining the welfare system, and so far, so good. So I transitioned from soft science to hard science. What was once long ago a kid's hobby is now my second career.

To immerse myself in this great opportunity, I bought a SkyShed POD, put an 8" Schmidt-Cass in it (I'd had a C5+ for years), and visited Morrison, Adler, Shafran, Flandreau, COSI (Center of Science and Industry in Columbus, Ohio), and eventually, Kitt Peak, Mt. Lemmon, Mars Hill, Meteor Crater, and Greenbank.

It has been a great learning experience, and I feel I owe it to the museum to keep up to speed.

Prior to my tenure, programs had been purchased, reworked, and read by the planetarians. I felt we could do as well producing our own, so the museum purchased a couple of computers and a DLP to produce and present the material. We now use two DLPs for imaging slides we put together using PowerPoint. Basic PPT is awfully lame, but when you learn to animate and draw, it's better than any slide.

We use no other computers; it's hands on the console.

It takes about 15 hours a week to do all the scheduling, administration, most of the maintenance, write and produce all of the programming and a monthly column for the Akron *Beacon Journal* and a different one for the Canton *Repository*.

I have a part time staff of three. Not only do we maintain a relationship with the two local astronomy clubs, we hire their members, usually past presidents, as planetarians. They share their passion and knowledge in a wonderfully entertaining fashion. They take my script and add their own personal flavor and anecdotes. No presenter comes across exactly like another, and that, I firmly believe, is an absolute plus.

We have been doing live interactive programming long before it became LIPS, and, although this is sort of embarrassing, we have often been compared favorably with Buhl. I attribute this to our interactive, er, LIPS, approach. We've always done it this way.

Our attendance at the planetarium usually runs about half of the paid attendance of the museum; a visit to the planetar-

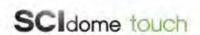
(Continues on Page 70)

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Educational Horizons

Jack L. Northrup Dr. Martin Luther King, Jr. Planetarium King Science and Technology Magnet Center 3720 Florence Blvd., Omaha, Nebraska 68110 USA +1402-557-4494 jlnorthrup@fbx.com

I'm taking a break from the instructional strategies articles. If you have used one or several of the strategies, please email me (jl-northrup@fbx.com) with how it went.

This edition's focus is on experimentation. It isn't just science fair.

Working outside the book

Our science classes don't just cover what is in the book, but also have the students read current events articles. These articles are often very useful for catching the interest of the students and getting them to ask questions.

This spring a couple of articles got a pair of students thinking, "Where is the best location for solar panels on our school?" They read about how the Mars Exploration Rovers were powered, and also how a local business was installing solar panels on its roof.

Not having the budget to complete an en-

Angle	Voltage (millivolts)	Propellor activity
30 degrees behind Sun		
20 degrees behind Sun		
10 degrees behind Sun		
0 degrees		
10 degrees ahead of Sun		
20 degrees ahead of Sun		
30 degrees ahead of Sun		

ergy study, the students decided to repurpose some parts from a solar-powered toy car, a protractor, multimeter, and a few straws. They would measure the voltage on the multimeter, but they also wanted to visually see the change in effectiveness of the location/orientation of the solar panel, so they installed a small motor with a propeller.

Now came the interesting part: they had to do some research. How do you wire a motor to a solar panel, and how do you connect a multimeter to read voltage? These were questions that they had to look up, because I wasn't going to give them any easy answers.

They predicted that the solar panel would show the highest voltage when it was within 10 degrees of the sun's location. When they were ready to test their experiment, they waited until solar noon and set up the rig on the concrete patio in our garden with the long

axis of the solar panel oriented north and south.

The wire guide for the solar panel worked as a gnomon and they could measure the angle of the solar panel in relation to the sun. At the left is a sample of their blank data table and a picture of the final testing rig.

They then repeated this experiment at different locations on the school property, and took the different locations and compared

Left: The students at work on their collector design, and the collector in use on the school grounds. All photos by author except for Inset: the solar car used for parts was Pitsco Solar Designer Car (W50073). Image courtesy Pitsco Education; used with permission.

them to see if they could find the best location on the property for a solar panel installation

Was this a difficult experiment? No. Did it increase the world's knowledge of the subject? No. Did it provide students with the opportunity to demonstrate knowledge of the experimentation process? Yes.

Learning through aquaponics

For the last two years we have been growing vegetables without soil. The process is called aquaponics, when water from an aquarium is used to water plants in a gravel or expanded clay environment. The project started as an urban gardening project, but astronomy students saw that it had many principles similar to NASA's aeroponics systems.

The original bed is 4 square meters of grow-

ing area that we planted in romaine lettuce. The water tank attached the grow bed housed 10 tilapia. Ammonia from the fish waste is pumped to the grow bed with the water and converted to nitrates by bacteria in the gravel. plants



use the nitrates to promote growth.

When the grow bed is full of water, it triggers a bell siphon that drains the bed back to the tank. Students monitor the tank's temperature, pH, ammonia, nitrate and nitrite levels, testing each Monday, Wednesday and Friday and logging their findings.

Six months and four harvests of lettuce later, the students decided they wanted to try another version of this system. They wanted to see if a grow bed could be built that did not require massive amounts of gravel to fill, instead using pots with gravel in them. They found a supply of PVC pipe from a parent's remodeling project and constructed a tube version of the aquaponic garden.

Water is pumped to the top pipe and when it fills to three-quarters full, it overflows to the next level down, where it repeats the filling and flooding of the next level. Finally, the water flows back into the tank.

The students used romaine lettuce as the first test plant after the success they had in the previous system. At first the plants did

(Continues on Page 42)



Kyle Doane, continued from Page 18

The more people who can have this universe perspective and understand the place of our tiny blue planet, the more difficult it is for them to be exclusive and extremist in their beliefs. As simple as this sounds, I do believe that peace comes through understanding.

The money that I'm raising is just to cover the cost of shipping the equipment to Kenya and training the members of AASK. This is a very small investment for a project that will have such an important impact. The planetarium will be a place where people can begin to understand and appreciate other cultures and have a glimpse at our true place in the universe. It will inspire the next generations of scientists who will further our understanding of—and on—our tiny blue world.

As I write this, I am just twenty days from being in Kenya with the system and starting to train the educators. I'm still in the campaign process to raise the \$8,000 that I need to cover the costs of getting the system to Kenya. I thought that raising this relatively small amount of money for such a worthy project would be easy. It is not.

I am proceeding with the knowledge that this project is important and with faith in our community to help. I've very grateful to all of those who have been part of this project; this is very much a community effort.

By the time you are reading this message, I should have completed the delivery of the planetarium and training of the staff. However, Africa has a wonderful way of bringing new and unforeseen challenges and I look forward to sharing the stories and the lessons learned. As the Swahili phrase goes, "Haraka, haraka hyena Baraka" which means "Hurry, hurry has no blessing."

I hope that many of you will take an interest in cultivating budding astronomy in developing nations. Some may even venture to Kenya to work with "Nomad Dome Kenya" or to Dr. Jacob Ashong's planetarium in Ghana—or even start your own project. Let me know what I can do to help. I guarantee that your impact will effect generations to come and that your life will be forever changed.

Update: As of press time, delivery delays through customs and a fire at Nairobi's Jomo Kenyatta Airport mean that the amount of training time will be cut short, and Kyle plans to return to Kenya during the next school break in January. - ed.

Education, continued from Page 41

very well and showed a great deal of growth. This only lasted about 12 days, and then the plants started to yellow and go limp. While they were researching possible causes, they discovered that the roots were not getting enough oxygen and dying. A student noticed that, unlike the big grow bed that completely drained during a cycle, the tubes were constantly filled with water.

This led to the design nicknamed "microaquaponics" which used a plastic tub with a lid as the grow bed and 6-cm pots to hold the grow medium and plants. This system was also equipped with a bell siphon to periodically drain the water away from the roots.

Also, instead of tilapia, the students decided to use goldfish because the tank was shallow enough that a larger fish could jump out.

Today there are three large grow beds and two micro-aquaponic beds running with a variety of plants: herbs, lettuce, spinach, collards, beets, carrots, and radishes. A fourth bed is planned that will raise shrimp instead of tilapia.

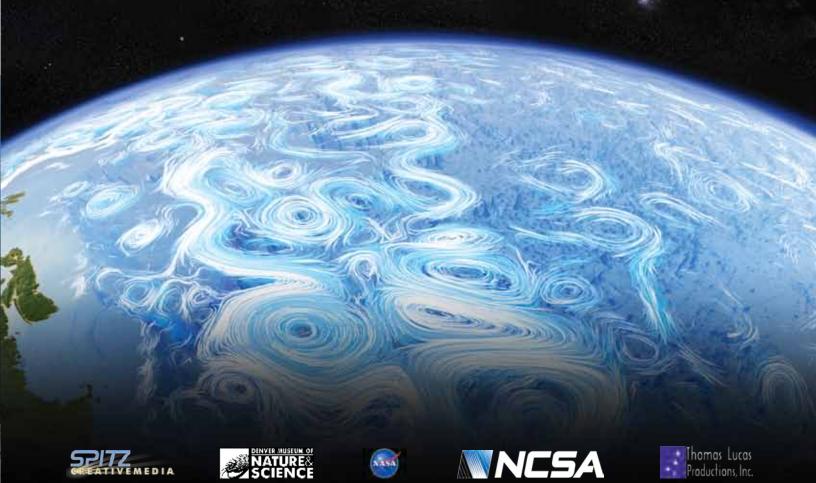
Students also like harvesting vegetables for their sandwiches and salads, knowing exactly were it came from, and donating the excess to the local food pantry.



NARRATED BY LIAM NEESON

M

Exploring Earth's Climate Engine











International News

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While editing this column in late July, I was also preparing for my participation in the IPS Council Meeting in Bolzano, Italia, 9-10 August. Although I am no longer representative for the Nordic Planetarium Association (since she took over as president of NPA two years ago, it is instead Aase Roland Jacobsen). However, I have been designated proxy for the Rocky Mountain Planetarium Association, so I will vote on issues for RMPA.

I also will attend as chair for the IPS Awards Committee. It is this odd-year Council meeting that decides about awards to be given and Fellows to be named during IPS'14 next year, 23-27 June in Beijing, China.

Call for Nominations were sent to all IPS members with *Planetarian* 4-2012 and also by email this spring, and the Awards Committee was happy to receive a fair number of nominations before our deadline.

So, Jeanne Bishop, Susan Button and I will have several suggestions for Council to decide upon. The rest of you will have to wait until June 2014 to learn who will become the new IPS Awardees and Fellows.

The International News column is built on contributions from IPS Affiliate Associations. If you have news that you want colleagues worldwide to read, please send it to your IPS representative, whose names are always listed on page 2. Their deadlines are 1 October 2013 for *Planetarian* 4/2013 and 1 January for 1/2014, so they need your news ahead of those dates.

You who want to contribute news from parts of the world where IPS has no Affiliate Association are welcome to send it to Martin George, martingeorge3@hotmail.com.

For contributions to this International News column, I sincerely thank Agnès Acker, Vadim Belov, Bart Benjamin, Ignacio Castro, Alex Delivorias, Sandro Gomes, John Hare, Warik Lawrence, Ian McLennan, Loris Ramponi, Aase Roland Jacobsen, Patty Seaton, Christian Theis, Rachel Thompson, and Michele Wistisen. I wish you and other representatives back with news for upcoming *Planetarian* issues.

Association of Brazilian Planetariums

The XVIII Meeting of the ABP takes place

at the Johannes Kepler Planetarium located inside SABINA, a science center in the city of Santo André in São Paulo State, 22-26 September.

Rio de Janeiro's Planetarium is organizing its III Fulldome Workshop on 2-6 December. During the night, the dome will be open for Rio Show Dome, a fulldome exhibition open to the public.

Association of French-Speaking Planetariums

The 29th APLF conference in Saint-Michel l'Observatoire, 9-12 May 2013, was organized by the Centre d'Astronomie under the supervision of Dominique Ducerf, director, and Di-

dier Mathieu, APLF president.

The conference gathered about 90 participants. A lot of animations and talks were presented: the constellations through the regard of Remus Cirstea from Romania, planetarium simulations adapted to blind public, the large database of Daniel Audeon, the staff dome for the new Reims Planetarium, collaboration with teachers and amateur astronomers, and interactions with political officials.

Night observations of the Haute-Provence clear skies were conducted with the 60-cm (24-in) telescope and other instruments of the Centre d'Astronomie.

Auguste Le Van Suu, director of the Observatoire de Haute-Provence (OHP), presented the double face of OHP activity, through a visit to the telescopes (astronomy, research on exoplanets), and of a dwarf oaks forest, observed with and without sunlight (ecology).

The General Assembly was followed by travel to the nice village of Banon, where a 6-m (20-ft) dome installed by RSACosmos and two mobile domes from Albert Planetarium welcomed the participants for a fulldome festival.

During the annual event Printemps (Spring)
(Continues on Page 46)



AFP: Top left: Aldo Cabanis celebrates the APLF Printemps des planétariums. Curtesy of Parc du Cosmos. Top right: The 29th APLF conference visit of the 2-m telescope from the Observatoire de Haute-Provence. Courtesy of Lionel Ruiz. Below: Participants at the APLF conference. Courtesy of Centre d'Astronomie—Saint-Michel l'Observatoire.

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International, continued from Page 44

des Planetariums 16-24 March, coordinated by Aldo Cabanis, 17 theaters located in different French regions invited their visitors to various events: planetarium shows, technical demonstrations, night observations, and talks on the cosmos and on Earth sciences.

Association of Mexican Planetariums

Mexican Planetariums fostered public participation in events such as 2013 Stars Night, and, thanks to 2,978 people viewing from 39 sites, broke the Guinness World record for the most telescopes pointed at the same place at the same time. The telescopes were pointed at the moon. Among the sites were planetariums, which were among the sties in 23 states taking part.

The same event took place during 2011, also won by Mexico.

Recent news from the southeast of Mexico: a new planetarium is to be inaugurated before year's end in Cancun, state of Quintana Roo. With a Digistar 5 projector and a 12-m (40-ft) dome, it will be part of the Cancun Cultural Center.

Another planetarium is still in the planning stage, this one with an 11-m (37-ft) dome, is the Cadereyta Municipal Planetarium in the state of Querétaro. No projector has been chosen yet. Collaboration in the planning has been requested of Jorge Sánchez, current AMPAC president and responsible for the Rehilete Planetarium in Pachuca.

Also, around the time we receive the September issue of *Planetarian*, we will be holding AMPAC's 2013 annual meeting, set for the Puebla Planetarium 26-28 September. An excursion is planned to visit the Large Millimeter Telescope (LMT) Radio Telescope at the la Sierra Negra Volcano at 4400-m (14,700-ft) altitude.

Australasian Planetarium Society

The Australasian Planetarium Society held its 2013 annual meeting at the Sir Thomas Brisbane Planetarium on 22-23 April. This was a very busy meeting and the program included fifteen planetarium shows, seven presentations, the general meeting, and the APS 2013 Dinner.

For the first time the APS meeting was held on a Monday and Tuesday, instead of over a weekend. The planetarium was closed to the public and this allowed the meeting to take place almost entirely in the dome. Consequently, the participants managed to see a lot more shows than they typically do at an APS meeting and plans are to continue this format for future meetings.

Mark Rigby, curator for the Sir Thomas Brisbane Planetarium, gave a short presentation on the recent planetarium upgrade facilitated



APS: Attendees of the APS meeting enjoy the sunshine outside the Sir Thomas Brisbane Planetarium. Photo by Duncan Waldron.

by Sky-Skan. This included some terrific timelapse video of the construction of the planetarium's new Astro-Tech dome.

Also presenting at the meeting was Takayuki Ohira, from Ohira Tech Ltd, who recently installed Brisbane planetarium's new Megastar IIB optical star projector. This star projector displays a very impressive star field with over five million stars.

Australia and New Zealand cover a large area, and flying from Perth to Sydney can cost as much as an international flight. At the AGM it was agreed that the APS would introduce a travel bursary to assist members who require additional funding to attend APS meetings.

Also for the first time, prior to the APS meeting, all of the members were encouraged to provide an activity report for their institutions. This was well received, with nine institutions providing written reports. The reports were collated into a 25-page document with lots of photographs, and offer a very informative account of the collective activity of the APS over the past 12 months.

However, the most effective form of communication that is currently used at APS is the Wordpress blog at apsplanetarium.com/aps-blog. This is proving to be a most effective resource for sharing information within our group as well as promoting the role and work of the Australasian Planetarium Society to the wider community.

Canadian Association of Science Centres

Halifax. Canadian Planetarium news from east to west starts with Discovery Centre Halifax, Capital of Nova Scotia, which is planning a 10-m (33-ft) diameter planetarium facility as part of a major new science center that is being constructed inside an old, de-commissioned power station.

Architects are Moriyama and Teshima from Toronto (original architects of Ontario Science Centre and Science North), assisted by Bill Chomik of Kasian Design Calgary and Ian McLennan. A technology search is currently underway and the new facility is expected to open in mid-2014.

Toronto. The Ontario Science Centre continues to offer programs in its planetarium to those visiting as part of a school group during the academic year. These were offered to 210 groups representing 6,650 teachers and students.

There are two shows

for the public, Cosmic Journeys for general audiences and the extremely successful toddler program, Eyes on the Skies. In 2012, the combined attendance for these shows was 45,179. This (northern) fall, OSC will launch The Extreme Universe, a new show developed in collaboration with the University of Toronto's Department of Astronomy and the Canadian Institute for Theoretical Astrophysics.

Hamilton. The McCallion Planetarium is involved with combining some of their local research interests (history of astronomy) with specially-designed outreach activities. As an example, they are preparing ancient Egyptian astronomy/science activities for the planetarium and classroom to be used in the university's summer camps. Planetarium Director Robert Cockcroft spoke more about this initiative, and gave examples with sundials and star clocks, at this year's LIPS conference in Sanford. Florida.

Edmonton. TELUS World of Science-Edmonton continues to run fulldome shows in the 250-seat Margaret Zeidler Star Theatre using a Sky-Skan projection system run by Digital Sky 2. They recently began showing the E&S production of Experience the Aurora, which ties in well with the recent auroral activity being experienced in the evening sky and with the (northern) summer visitor traffic

For the autumn period they will run the show Cell, Cell, Cell in both the school program schedule and public schedule as a tie-in to the Body Worlds: The Cycle of Life exhibition on display elsewhere in the center.

The local chapter of the Royal Astronomical Society of Canada has been busy working with science center staff maintaining and upgrading the public observatory's equipment. A welcome addition to the array of telescopes in the observatory is a 43-cm (17-in) Planeware telescope on a Software Bisque Paramount. Considering the somewhat light polluted skies at the location, the telescope has pro-

duced spectacular results.

Calgary. The Calgary Spark DVT dome theatre, managed by Barry Thorson, was pressed into service at this years' annual conference of Canadian Association of Science Centres, which was held in Calgary just a week before the city was inundated by unprecedented floods from the Bow and Elbow rivers.

A number of planetarium people, including representatives from major equipment suppliers, attended dome sessions, including looking at IMAX films projected through the Digistar system as well as fulldome point of view movie sequences shot the same day by Craig McCaw. During the conference's general meeting, Ian McLennan was re-appointed to a three-year term as the CASC representative to IPS.

Vancouver. The H. R. MacMillan Space Centre has undergone a technical transformation with the removal of all its old slide and special effects projectors, replaced by a Colorspace 4K digital video system in its 20-m (67-ft) dome theater.

The first presentations with the new hardware were scheduled on 2 August 2013. Before the old equipment was de-commissioned, a British Columbia ensemble, The Electric Company theatre group, used multiple spaces in the H.R. MacMillan star theater to explore notions of transcendence and modernity, especially as they relate to scientific advances.

Victoria. Centre of the Universe, a popular astronomy interpretative facility that includes a STARLAB portable planetarium, was slated to be shut down as an austerity move by the National Research Council (NRC) of the Government of Canada.

The facility is located at the Dominion Astrophysical Observatory in suburban Victoria, a major astronomical research center dating back to 1918.

About 10,000 people visit Centre of the Universe each year, and in the wake of an immediate backlash from the public, NRC was looking for ways the facility could remain open at the end of the (northern) summer through



EMPA: After visiting Rijeka's planetarium, many visitors enjoy exploring the night sky through the telescope of the Rijeka Observatory, Summer 2013. Courtesy of Rijeka Sport Ltd.



CASC: Photos from *You Are Very Star*, last cultural production in the pre-digital planetarium at H. R. MacMillan Space Centre, Vancouver. Courtesy of Electric Theatre Company.

extensive use of volunteers provided by the Royal Astronomical Society of Canada, and others.

European/Mediterranean Planetarium Association

Croatia. The Astronomical Centre Rijeka (Rijeka Sport Ltd.) in Croatia produced in July a new planetarium show titled From the Earth to the Universe, scheduled to be shown in the afternoons of the summer period.

The show focuses on humankind's first steps to explore the universe, describing, among other things, the purpose of constructing space stations, the different types of artificial satellites and how they operate, as well as their importance in advancing humanity's knowledge of the cosmos.

In July, the centre introduced in its regular program a 10-minute short film dedicated to the 44th anniversary of the Apollo 11 mission, which landed the first astronauts on the moon, as well as to the 38th anniversary of the historic handshake in space between mission

commanders of the joint Apollo-Soyuz mission, Thomas Stafford and Alexei Leonov.

For the second week of August, visitors had the opportunity to enjoy Tears of St. Lawrence, a new production focusing on the Perseid meteor shower. During September, The 10 Greatest Constellations, a live planetarium show, will introduce the wider public to the main constellations of the northern hemisphere for every time of the year.

During the presentation, Rijeka's educators narrate the fasci-



nating myths behind the constellation names and explain to the audience how to find the different constellations and their brightest stars

For the beginning of the new school year and as a part of the Saturday Matinee shows, the centre produced Ten Reasons Why I Love Astronomy, a new show for children and families, focusing, among other things, on the sun, the stars and the night sky, as well as the lunar and solar eclipses.

Throughout the summer months visitors had the opportunity to stretch their legs on the Saint Cross promenade, situated close to the Astronomical Centre Rijeka, which was promoted as part of the celebration for the European Mobility Week.

Greece. Owing to the fact that several events hosted by the New Digital Planetarium (NDP) of the Eugenides Foundation in Athens were organized after the previous EMPA news was written, NDP news for this current issue of *Planetarian* will start with a brief recapitu-

lation of what has transpired in its premises until June.

Thus, on 4 February the NDP inaugurated a special astrophotography exhibition titled Greece under the Stars, by young (23-year-old) astrophotographer Theophanis Matsopoulos, which included deep space images as well as more "artistic" night sky images taken over several of Greece's ancient monuments.

On 18 February, the NDP and the Hellenic Physical Society organized an evening dedicated to the brilliant physicist and teacher Richard Feynman.

The evening started with a brief introduction by Stratos Theodosiou (president of the Hellenic Physical Society and associate professor of History and Philosophy of Astronomy and Physical Sciences at the University of Athens), followed by keynote speakers Emmanouil Dris (emeritus professor in the National Technical University of Athens) and Apostolos Tournas (physicist and teacher).

The evening concluded with a presentation of a one-act play titled *QED*, or *What did Mr*. *Feynman Prove*, by actor George Kotanides.

NDP participated in the festive activities of the European Night of Museums on 18 May, with four free-of-charge screenings of its 2013 production *The Live Planet*, a public lecture on the standard model of cosmology by Manolis Plionis (professor in Astrophysics, Astronomy and Mechanics Section, Physics Department, Aristotle University of Thessaloniki) and offered its visitors the chance to observe the night sky through the telescopes of the Hellenic Astronomy Society.

On Monday 10 June, it was the turn of ESA astronaut Claude Nicollier to captivate his audience, sharing with them his experiences in space, in an event organized by the National Observatory of Athens and the Eugenides Foundation.

As part of the activities to celebrate the summer solstice, NDP screened *Coral: Rekindling Venus*, an astonishing 20-minute feature by Lynette Wallworth. During the summer months the planetarium's staff continued working on its latest production *On the Pathways of the Stars*, while September was reserved for necessary maintenance work, including the total replacement of all of its computers, an upgrade of its software programs, as well as a necessary restoration of its rendering, production and storage farms.

On the Pathways of the Stars is scheduled to premiere on 4 November, as part of the New Digital Planetarium's festive activities to celebrate its 10th anniversary, but more on that in the next issue of *Planetarian*.

Great Lakes Planetarium Association

Illinois. Peoria's Interplanetary 5K has doubled its size over the last three years, to 380

runners, walkers, and children. This year was the first run from the new downtown Peoria Riverfront Museum, where the terrestrial planets will be permanently located along the Riverfront Trail.

Peoria's Community Solar System is being rebuilt, centered on a new sun on the plaza of the Riverfront Museum and a new, larger scale of 99,000,000:1. Portions of the new model are in place, and Jupiter and Saturn should be completed before the end of the calendar year.

At the William M. Staerkel Planetarium at Parkland College in Champaign, the Goose Kaler Memorial Meteorite Collection is now on display in the planetarium's lobby. It features samples from Canyon Diablo, Namibia, Klamath Falls, and Russia. The planetarium's recent live harp concert and improvised concert performed on laptop computers were both very successful. Local children can now

join the planetarium's new Galaxy Club.

Indiana. The Merrillville Community Planetarium installed new projectors for their Digital Sky System in February.

Chuck Bueter reports that the planetarium community near South Bend will be actively participating in the Comet Festival (www.cometfestival.com), a celebration of Comet ISON and its uncertain outcome after perihelion. As part of this Comet Festival, Dayle Brown is organizing a Comet Festival Art Exhibit to be shown during the festival.

Caroline Fletcher reports that the Kennedy Planetarium in South Bend recently completed a complete renovation.

The SpaceQuest Planetarium in the Children's Museum of Indianapolis premiered its first fulldome show in February, titled *Flight Adventures*. As part of the NASA grant agreement, they've also distributed the show to 29 U.S. planetariums, to numerous planetariums in India and Mexico, with possible venues in Australia and Egypt. The Children's Museum has a new staff member, astronaut and Indiana native Dr. David Wolf. One of his priorities is to share the extensive Indiana state heritage of space and NASA connections.

The Edward Clark Schouweiler Memorial Planetarium at the University of Saint Francis in Fort Wayne has nearly completed its pro-



GLPA: Top: Group photograph from the 2013 Michigan State Meeting in Abrams. Photo by Dale Smith. Below: Group photograph from the 2013 Ohio State Meeting in Dayton. Photo by Dale Smith and Adam Leis.

duction of SEPA's *The Planets*. This show was slated for premiere during Fort Wayne's annual Three Rivers Festival in July.

Michigan. The Longway Planetarium recently showed its new production, *How I Wonder*, a show based on questions that children have asked over the years. Also playing by popular demand was *Off the Beaten Orbit*, a show about the solar system that talks about everything but the planets.

The Eastern Michigan University Planetarium's Sherzer Observatory received much needed roof reconstruction in May, getting new shingles and a smooth patio block observing deck. Newly painted railings, telescope repositioning, equipment upgrades (which include deck-mounted Celestron GoTo telescopes and H-alpha filters) will enhance the experience for planetarium visitors.

The University of Michigan's Museum of Natural History Planetarium has broken attendance figures for the past two years. An NSF-funded short demo on *Dark Matter and its Role in the Early Formation of the Milky Way* has been completed and is in Switzerland, being reviewed by the SCISS team before being released to Uniview domes world-wide. This is based on the work of Dr. Monica Valluri at U-M and her colleagues in two countries.

(Continues on Page 50)





GLPA: Inside Nassau Observatory during the recent CRAP meeting. Photo by Wes Orloff.

International, continued from Page 48

Ohio planetarians gathered for their 2013 spring meeting in Dayton in April. During the morning session at Boonshoft Museum, Cheri Adams and team showed several of the full-dome teaching modules they have developed since installing a Digistar 4 system last year. One of the modules featured a Jeopardy-style set of astronomical questions that gave those in attendance a chance to show how much (or little) they knew.

Recently the Cleveland Regional Association of Planetariums met at the new Observatory Park in Geauga County for a tour of this vast facility. The Nassau Observatory houses the former Warner & Swasey observatory telescope. The Geauga Observatory Park is located in one of the few dark sky locations in Ohio and consists of more than 1,000 acres of rural land. It is a site that all astronomy buffs should try to visit.

Two veterans are retiring at the Shaker Heights High School Planetarium. First is Gene Zajac, who has led the planetarium with his inimitable blend of style and substance for the past 24 years, following inaugural director Dave Sanford. Second to retire is the Spitz A4, installed in 1970, just a couple years before Gene began teaching in the Shaker schools.

Replacing the A4 will be Spitz's SciDome Touch HD Digital Projection System. Gene now moves to Put-in-Bay (South Bass Island in Lake Erie), he will be teaching the public about the night sky on four islands.

Back on the mainland, as the Bowling Green State University Planetarium prepares for installation of its own Spitz SciDome, Director Dale Smith has been running a retrospective of traditional shows from the planetarium's first decade of operation from 1984 to the mid-90s.

Wisconsin/Minnesota. Late in April, the Charles Horwitz Planetarium, in Waukesha, Wisconsin teamed up with the Pewaukee Astronomical Society to present the visual displays for the Wisconsin Philharmonic Symphony Orchestra's performance of Gustav Holst's *The Planets*. Also this spring, the CH Planetarium became the presentation arena for Waukesha High School's astronomy course projects. These astronomy courses are new for their school district, and the planetarium has become a major player in the course curriculum.

This summer, the Soref Planetarium (Milwaukee, Wisconsin) staff continued work on a show about the *Ice Cube Observatory* buried below the ice at the South Pole. This show will open in late autumn.

The University of Wisconsin-La Crosse Planetarium conducted two summer classes for the Young Scholars program in July. They were *Solar System Astronomy* and *Stars and Galaxies*.

The University of Wisconsin-Milwaukee Planetarium presented *Lunar Light* for the general public on Friday nights this summer, along with College for Kids classes (K-12) and teacher professional development workshops.

different shapes to simulate the life of stars) and a PowerPoint lecture, managed by Shi-Anne Kattner, Casper Planetarium technician and Discover Outreach presenter for the Na-

trona County School District.

A similar Skype experience about another astronomical subject, celestial bodies visible to the naked eye, involved secondary school students in French in contact through Skype with Jerome Galard of Laval Popular Observatory, France.

The 2013 "A Week in Italy for an American Planetarium Operator" was given to Patricia Toth Seaton, director of the Howard B. Owens Science Center Planetarium in Lanham, Maryland, who visited in April. (See her complete report starting on page 59.)

The deadline for American teachers interested in taking part next year is 15 September 2013.

Signals from the universe is a scientific tour to visit the Guglielmo Marconi Museum and Medicina Radiotelescopes. This observatory is located 30 km from Bologna and operated by the INAF (Instituto Nazionale di AstroFisica, the National Institute for Astrophysics) at the Istituto di Radioastronomia. It hosts two radio telescopes: the large Northern Cross owned by the University of Bologna, and the twin 32-m parabolic antennas.

Italian Association of Planetaria

In Perugia in April and May, the I. Danti Planetarium and the A. Volta Technical High School organized different kinds of activities for students and the general public. Some of these were:

Geology of Umbria is a course consisting of four lessons aimed at students and teachers. Professors from the Perugia University ran the first three lessons about the geology of Umbria, fossils in Umbria, and the disappearance of dinosaurs.

The final lesson was set up with a Skype connection with the Tate Geological Museum in Casper, Wyoming, USA. Michele Wistisen, director of the Casper Planetarium, and Loris Ramponi, consultant of the Brescia Planetarium, also participated in the Skype connection.

Michele also helped coordinate a Skype lesson held in May inside the small astronomical observatory in the Castle of Brescia, where 40 secondary school students in English followed a lesson about stellar evolution, an interactive activity (balloons of





IAP: Above: Patricia Toth Seaton. director of the Howard B. Owens Science Center Planetarium, introduces the program for the public during her "week in Italy" visit. Courtesy of I. Danti Planetarium. At left: Astronomer Haruvuki Okuda receives in Brescia the first prize of the contest Shadows of Time. Photo by Emma Bellini.





MAPS: Top: The York Learning Center Planetarium. Courtesy of Todd Ullery, www.ycas.org. Below: Sun cookies. Courtesy of Steve Russo, www.bigsandy.kctcs.edu/eksc.

Last June in Brescia was held the awarding of prizes of the international contest Shadows of Time for sundial makers, organized by Serafino Zani Study and Research Center and Brescia Amateur Astronomer Union.

These were the members of the committee: Francesco Azzarita from Bari, founder of the sundial section of Italian Amateur Astronomers Union; Piero Bianucci from Turin, journalist; Mirco Antiga from Desenzano, Brescia Amateur Astronomers Union; and Giovanni Paltrinieri from Bologna, sundial maker.

The committee of the contest examined the works presented and decided to give the prizea as follows: first prize to the astronomer Haruyuki Okuda, Tokyo, Japan; second prize to Simone Bartolini, Scandicci, Florence, Italy; and third prize to Miloś Nosek and Hralové Kràlové, Czech Republic. Among the professionals, the committee selected Yves Opizzo, Haigerloch, Germany.

Okuda received the prize in Brescia together with Opizzo. Professor Masato Oki, Japan Sundial Society, also participated at the ceremony with many other sundial specialists. The images of the best works are available at page www.astrofilibresciani.it/Meridiane/Ombre_del_tempo/Immagini/XII_Edizione/Dodicesima edizione.htm.

Middle Atlantic Planetarium Society

This quarter, MAPS highlights two planetariums in its region: the York Learning Center Planetarium in York, Pennsylvania, and the East Kentucky Science Center and Planetarium of Prestonsburg, Kentucky.

The York Learning Center Planetarium had a good year. They continue to have public programs on the second Friday of the month during the school year and private programs for school groups and scouts throughout the year. The staff reports that the IPS conference in Baton Rouge really changed the way they do programs.

Max Goes to the Moon has been a big hit with families and school groups.

Since budget was a major factor in considering fulldome options, Planetarium Director Todd Ullery worked with Adam Thanz, Paul Bourke, and John Hare to devise a system using a mirror and bright high definition projector. This spring they showed Flight Adventures as their first fulldome

movie, and this fall plan to add Cosmic Castaways and Google's Lunar X Prize in fulldome.

Surveys with audiences in May who viewed both *Flight Adventures* and a regular rectangular video of *The Planets* preferred the environment of the mirror dome experience.

Over 125 people showed up at the East Kentucky Science Center and Planetarium for National Astronomy Day activities on 20 April 2013. Along with planetarium shows throughout the day, there were activities and demonstrations relating to heliophysics.

In the planetarium before each show, the audience had a chance to view current im-

ages of the sun from the Solar Dynamics Observatory and SOHO, and also to view the sun through the science center's Coronado solar telescopes and through eclipse glasses.

In the classroom and exhibit hall, adults and children made models of the sun out of cookies, Twizzler sticks, chocolate chips and frosting, and also got to make sundials from the NASA SDO website and "construct" uv-sensitive solar bead bracelets.

Funding for these activities came from a NASA workshop that Director Steve Russo attended at the NASA Goddard Spaceflight Center. Door prizes and other astronomical handouts were supplied by Astronomy magazine and the NASA's Space Place.

On 1 June, the planetarium premiered the new Sky-Skan fulldome show *To Space and Back*. This program, which takes a look at how space technology is used on Earth, has received rave reviews from the public. The information is important to show people that space exploration is not a waste of money. Summer was busy with ten camps that covered a wide range of topics from astronomy, physics, color, earth science, and space exploration.

Nordic Planetarium Association

The planetarium at the Steno Museum in Aarhus, Denmark will take visitors on an underwater journey to look at seaweeds and sea meadows in the planetarium show *Sea Plants:An aesthetic planetarium experience.* Programs will be offered once every day for the rest of the year. Unlike terrestrial vegetation, sea meadows and forests are not visible and therefore are often unknown to people. In many cases, it requires diving equipment to experience the diversity that exists beneath the surface.

How did the planetarium dome become filled with sea weeds? It started in fall 2011, when Aarhus University Press published a book titled *Sea Plants*. The book was presented at a mini-symposium in the planetarium at the Steno Museum, and its editor, Peter Bondo Christensen, became so enthusiastic about the opportunities presented in the planetarium that he got the idea to produce a planetarium show.

The show was based on the many beautiful photos and movies in the book. He found money for production, and the composer Maja Egebo Schriver was hired to write the music and a script for the show.

The planetarium show is intended as an aes-



NPA: Sea weeds in the dome. Photo by Peter Bondo Christensen.

thetic and artistic experience in sound and pictures. The book *Sea Plants* and a corresponding website are suitable for biology education at elementary and high school levels, and a visit to the planetarium can then be the introduction or conclusion of a course.

Lars Broman, Strömstad Academy, visited Ukraine 20-26 April. There, he visited both Kyiv Planetarium and Gagarin Planetarium in Kharkov, as well as several universities in the two cities. He took a trip to Chernobyl, where he was allowed to enter the forbidden zone containing the nuclear reactor that exploded on 26 April 1986, and the deserted town Pripyat.

He also brought Broman Planetarium's and Teknoland's Starlab Fibrearc projector to Gagarin Planetarium for use in their outreach program.

Rocky Mountain Planetarium Association

Ron and AmyJo Proctor at Weber State University's Ott Planetarium have been leveraging Blender for fulldome production. They just finished work on *First & Farthest*, a STEMfocused look at the space race. AmyJo Proctor has started production on a common corebased chemistry show, and Ron Proctor is targeting general audiences with a mathematics show. Both shows are on track for a December 2013 release.

Ott Planetarium released a free online introduction to Blender in July. The course, available year round, will be followed with specialized workshops and additional online content in coming years.

Carolyn Peterson from Loch Ness Productions, Colorado, has been working with the app developer of Starmap to create a series of short narrated animations for iPad and iPhone. This app gives a personalized planetarium show to the user as he or she browses the sky.

The updated product was released in summer 2013, and should be a very useful educational tool for both beginning and experienced stargazers. Check it out at www.star-map.fr.

In October 2012, the Dorrance Planetarium, Phoenix, Arizona upgraded its system from Digistar 3 to Digistar 5. It started the staff on a path of learning how to operate the new system, converting D3 shows and scripts to D5, and navigating a learning curve that, at times, seemed steep.

They made it through those initial times and their audiences have loved the new system and all the power that it possesses.

A correction: The two RMPA solar eclipse photos on page 48 in *Planetarian* 2-2013 should be credited to Derryl Barr.



NPA: Gagarin Planetarium Director Galyna Zhelesnyak, Lars Broman, and Irina Onipko in the planetarium's exhibition hall. Courtesy of Lars

Russian Planetariums Association

St. Petersburg. The Russian-Scandinavian project Cosmo-Week: Space in Science and Art took place in the planetarium in April with the following participators: Ratio Art, international agency of intercultural communications; natural science museums from Finland and Norway; Danish Institute of Culture in St. Petersburg; Pilot-Cosmonauts of Russia; scientists from University of St. Petersburg; Institute of Foreign Economic Relations Economics and Law; interregional non-government organization Znanie (Knowledge); Main Geophysical Observatory; Research University of Information, Technology & Mechanics and Optics; teachers and learners from St. Petersburg's schools; students of higher schools; and a number of foreign guests.

The participants of the opening ceremo-

ny of Cosmo-Week took a part in the joint interactive art action Make a Starry Sky. The extensive program included new lectures, reports, showing of laser theatre, cinema showings, and presentations.

Within the framework of the week, the competition of child fantasy stories was resumed and an exhibition of child pictures opened. The head of Finnish planetarium from Jyväskylä conducted educational games with children.

The Danish Institute of Culture in St. Petersburg represented for the show the unique silent science fiction movies *End of World* from 1916 and *Journey to Mars* from 1918, while the local studio Miris showed the movie *Star Dreamer*. Studio Lennauchfilm showed, in commemoration of its 80th jubilee, the movies *Meteorites* from1947 and *Mars* from 1968.

A round table was held on the themes Modernization of Science Museum and Interaction of Science and Culture in Natural Science Museums and Planetariums. During discussions there were considered the role of such a museum in the modern highly technological world, the opportunity of creation of interactive exhibitions, status of science building in community,

and also interaction of art and science in the dissemination of achievements and science history.

Particular interest was aroused by the workshop Space in Antique and Modern Art. Painters from Finland, Norway and St. Petersburg created their artworks in regard of the theme of intuitively-artistic perception of space. Their works, specially chosen for exhibition works of the antique artists, became the important part of the gallery's exhibition Ratio-Art-Planetarium, opened on 25 May.

The following items were presented for visitors:

To be aware with the history of space cinematography, which was begun from the science fiction movie *Flight to the Moon* of J. George Méliès.

(Continues on Page 54)



RPA: Ilpo Kuusela, Director of Kallioplanetaario, Jyväskylä, Finland plays with children in the hall of St. Petersburg Planetarium. Photo by Galina Mihaylova, Cosmo-Week.

FRAGILE PLANET

Develop a renewed appreciation for our fragile planet. Sigourney Weaver narrates this immersive excursion that explores a universe filled with the possibility of life.





Narrated by Academy Award winner Jodie Foster, *Life* launches the audience on a journey through time to witness key events since the Big Bang that set the stage for life.



Earthquake explores the forces that transform the surface of our planet and influence the course of human history. Narrated by Benjamin Bratt.



IMMERSE + ENGAGE

Fulldome science storytelling from the CALIFORNIA ACADEMY OF SCIENCES



International, continued from Page 52

- To listen to music of space, as created by authors as real sounds of space, and also contemporary music work listened to by the spaceman on the orbit.
- To be in the mysterious room of Light and Space, which was created by the famous Russian physics popularizer Yakov Perelman;
- To turn over the pages of books specially created for the exhibition Space library. The project took place by the support of Information Bureau of North Countries Ministers Council in St. Petersburg.

Organizers have decided to conduct the Cosmo-Week every year.

Yaroslavl. The science practical conference Cosmonautics and Nation Culture took place in June at the Valentina Tereshkova Culture-Educational Center, dedicated to the 50-year jubilee of travel in space by the first woman, Valentina Tereshkova.

Participants of the conference included pilot-cosmonauts of Russia, veterans of cosmonautics, scientists, pedagogues, creative intelligentsia, learners, journalists, representatives of social organizations from different towns of Russia, and also a number of foreign guests.

The head of RPA Zinaida Sitkova, on behalf of the creative planetarium's workers, warmly congratulated V. Tereshkova and explained the hope for her help, as deputy of State Duma of Russian Federation, in support of Russian planetariums.

Participants visited the museum of V. Tereshkova in the village Nikulskoe, after which they viewed an exciting aviation show above the river Volga. Fighter jets was showed the tricks of high professionalism, forming in the sky the most different imagery, e.g. the shape of seagull (V. Tereshkova flew in space





RPA: Top: The hearty welcome for Valentina Tereshkova in front the Cultural Enlightener center in Yaroslavl. Below: Zinaida Sitkova congratulates V. Tereshkova as well. Photos by Andrei Lobanov.

with the call sign Chayka, or Seagull).

After the show, the Spacemen's Mall was inaugurated in front of the center and the new exhibition Valentina Tereshkova: Way to Stars was presented in the center's foyer.

Society of the German-Speaking Planetariums

In 1977, a small group of planetarium direc-

tors met for the first time for an information exchange. Some 36 years later, the informal meeting has developed into the internationally-renowned conference of the recently reorganized SGP, locally organized by the Planetarium of Klagenfurt, led by Kurt Anetzhuber.

More than 120 participants from 11 nations met 4-6 May 2013 in the state capital of Carinthia, Aus-

tria. At the conference venue, located next to Minimundus, a park of about 150 models of famous buildings around the world, the international character was even easier to grasp.

The topics of the conference covered many of the challenges planetariums are facing today. Various working groups discussed principles of teaching, public relations, and current problems of planetarium management. Plenary talks covered astronomical topics like cosmic dust by Thomas Posch, University of Vienna, and ESO's E-ELT by Peter Habison.

The presentation of science in planetariums by Uwe Neuhold, Verdandi and elsewhere by Robert Krickl was another topic. IPS-president Thomas Kraupe explained IPS and its importance for the whole planetarium community. Tomáš Gráf, Planetarium Ostrava, Czech Republic, informed about the status of digital planetariums in the Czech Republic.

During the FullDomeNight, six shows, some partially and some in full length, were screened. Thanks to the companies Zeiss and Sky-Skan, powerful projection equipment was temporarily installed in the dome of the Klagenfurt planetarium. The audience enjoyed excellent visualization of fulldome contents as well as the rare occasion of a direct comparison of different projection systems.

The next annual meeting of SGP will be held in collaboration with French and Italian colleagues at the beginning of May 2014 in Lucerne, Switzerland.

The 7th Jena FullDome Festival took place from 30 May to 1 June 2013 at the Zeiss Planetarium Jena, Germany. Each day started with a series of talks or workshops on actual topics of visual and sound aspects of fulldome productions. These were followed by fulldome shows.

In total, 24 feature shows were presented. Similar to previous years, the shows covered a broad range of topics, ranging from astronomical subjects and earth and life sciences to entertaining shows.

The first festival night was dedicated to short films and professional clips, and on Friday night to all student contributions. Altogether, the estimated one thousand festival visitors could experience 80 fulldome contributions from 17 countries.

A highlight was the awarding with the Janus trophy, a prize symbolizing the two-faced Roman deity. In total, nine Janus trophies have been awarded. Thanks to many sponsors of the FullDome Festival each of the winners, selected by the jury and festival directors, received the price money of 500 Euro.

Among the winners were students from Ringling College of Art and Design in Florida,



SGP: Participants of the second annual GDP conference strolling through the Minimundus park in Klagenfurt, Austria. Courtesy of Kurt Anetzhuber.

SWAP: The image shows a projection of the distribution of matter ejected in a supernova explosion simulation. The studied type of supernova exploded after the Fe-core of the 20 solar mass heavy progenitor star collapsed and triggered a blast wave. This blast wave created turbulence in the material as it tore the star apart, which resulted in the depicted morphology. Observations of supernova remants centuries after the catastrophic death of the star still show signs of this turbulence, which is an important piece in interpreting the data. Courtesy of C. I. Ellinger, G. Rockefeller, and C. L. Fryer.

from Potsdam University of Applied Sciences, and University of Fine Arts in Braunschweig. The audience voted for the clip In the Name of the King from Karim Eich and Livius Pápay, students at Bauhaus University in Weimar. (For a photo and all the awards, see IMER-SA news starting on page 26).

The Directors Award and Janus trophy was presented to the Copernicus Science Centre in Warsaw for its feature show Dream to Fly, which not only had its world premiere at the festival, but was enthusiastically received by the audience.

The next FullDome Festival will take place during end of May in 2014. More information can be found at fulldome-festival.de.

Southeastern Planetarium Association

SEPA recently concluded its 2013 Confer-



SEPA: Southern Skies longtime editor James Sullivan. Photo by John Hare.

ence, hosted by the Bryan-Gooding Planetarium in Jacksonville, Florida. Almost 100 delegates attended four days of the usual sleepchallenging activities. Included was a field trip to the Kennedy Space Center, which featured the brand new. emotionwrenching exhibit Space Shuttle Atlantis.

The banquet speaker, long-time NASA mission

control specialist and flight director for Apollo and other space missions, Sy Liebergot, held the delegates' undivided attention as he related tales of past events, including the drama of Apollo 13.

The Paul Campbell Fellowship Award was awarded in absentia to James Sullivan, the long-time editor of the SEPA journal Southern Skies.

The 2014 SEPA Conference will be hosted by the Buehler Planetarium at Seminole State College in Sanford, Florida. The location is close to Orlando. Conference dates are 15-19 July. Planetarium Director Derek Demeter and

associate Mike McConville are already hard at work with the plans. Watch this column for future details.

The site for the 2015 conference will be the Tellus Science Museum

in Cartersville, Georgia.

It was reported prematurely in the previous issue of *Planetarian* that the 2017 SEPA conference would be held at the Land Between the Lakes Planetarium at Golden Pond, Kentucky. After much input from members and vendors, the SEPA Council voted to decline the invitation.

2×10¹⁶

-1010

-2×101

SEPA will revert to the established policy of selecting conference sites 2 years prior to the conference. In that regard, anyone wishing to host the 2016 SEPA Conference should make their intentions known to any officer of the organization well before the 2014 conference in order to be under consideration.

Further information regarding SEPA can be found at sepadomes.org.

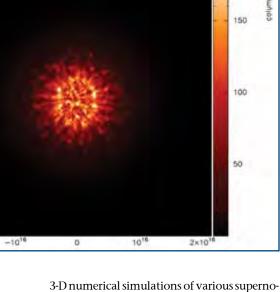
Southwestern Association of Planetariums

The Planetarium at the University of Texas at Arlington (UTA) has partnered with UTA Astrophysicist Dr. Sangwook Park to create realistic supernova explosions for the dome. Based on these 3-D simulations, he will be looking for promising solutions for Chandra X-ray observations of some prominent supernova remnants, such as Cassiopeia A and G292.0+1.8.

Supernova explosions are 3-D phenomena involving various asymmetries, both in the explosion itself and in the ambient medium. One of the main shortfalls in previous theoretical studies of supernova is their 1-D or 2-D nature.

Previous works focused primarily on the explosion itself, and largely ignored the evolution of the blast wave shock into the ambient medium for time periods of ~1000 years or longer. Both of these aspects are critically important to interpret the actual observational data of the remnants of supernova explosions.

"The main goal of this project is to perform



3-D numerical simulations of various supernova explosions and their evolution out to several thousand years after the explosion. Our simulations will test various scenarios of supernova explosions and environments assuming a broad range of the progenitor star's mass and the explosion energy, different explosion asymmetries and various environmental densities and asymmetries," says Dr. Park.

In June and July, the astronomy programs at University of North Texas Sky Theater offered special Friday planetarium programming to help beat the Texas heat. The theater offered a variety of shows, as well as solar viewing. The end of summer run brought Sky Theater an upgrade to Digistar 5.

On three Mondays in July, Fort Worth Museum of Science and History guests experienced a real adventure. Lights were out. Museum doors were locked. An echoing set of footsteps could be heard down the hall...

With pen-lights and a scavenger list, guests explored museum as exhibits as they came to life in their (presumably) normal state overnight. In the Noble Planetarium, adventurers found history truly had come to life: Galileo piloted the planetarium. His guided tour through space allowed for glimpses of favorite constellations, stories of the past, and, of course, a night at the museum to remember. Galileo was brought to life by Don Garland.

The museum's adventure accompanied the IMAX opening of Night at the Museum in the Omni Theater.

SWAP members located in the Dallas/Ft. Worth Metroplex, affectionately known to them as "the Local Group," met in early April at the Mesquite ISD, Russell Planetarium to share a potluck meal and news from their respective institutions.

SWAP President Levent Gurdemir, University of Texas, Arlington, promoted the WAC

(Continues on Page 70)

Mobile News

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"Navigating the night skies"

I have been anxious to visit the nearby Roberson Planetarium to see their recent updates and an opportunity presented itself this year. Judy Swanson, a friend who is commander of the Syracuse Sail and Power Squadron, invited us to a unique planetarium event. Sail and Power Squadrons are boaters committed to "safe boating through education."

The Susquenango Sail & Power Squadron, in conjunction with Roberson Museum and Science Center, presented *Navigating the Night Skies*, a spectacular program showing the seasonal stars and constellations and relating these views to celestial navigation.

Susquenango member and astronomer Don Rumrill, along with the planetarium staff, used the planetarium's new digital star projector to demonstrate the movement of the Earth relative to the night sky and showed how mariners have used the stars and planets to determine their location for centuries. This was an exciting educational program for boaters as well as stargazers.

You can learn more about the group at www.susquenango.org.

This is another valuable way that planetariums can take advantage of connecting to a local community group.

Mystic's Treworgy Planetarium

Speaking of celestial navigation, this year I also was fortunate enough to visit one of my all-time favorite planetariums. It is a small gem, with a 9-meter dome, located in Mystic Seaport, Connecticut. Their logo, "Stars: The Original Global Positioning System," tells it all!

Mystic Seaport is a "living history museum consisting of a village, ships and 17 acres of exhibits depicting coastal life in New England in the 19th century." The Treworgy Planetarium, which was specially designed for Mystic Seaport by Armand Spitz in 1960, is located on the museum grounds.

The planetarium staff offers visitors a chance to browse their 19th-century navigation exhibit, take planetarium navigation courses, or participate in group or school programs.

On top of that, students can experience the planetarium virtually in their classroom. Through special software, they can explore the geography, celestial navigation, and astronomical concepts that confronted sailors on the first voyage of the whale ship Charles W. Morgan.

The website explains, "The basis for this presentation is the primary source of the Morgan's first log book."

During our visit we were graciously treated to a full tour of the exhibit and a first class program in the planetarium. Our grandson, who loves mechanical things, was delighted to re-



After the planetarium program at Roberson, where Don Rumrill, in the blue shirt, was our presenter. At the end of his presentation he shared more information and some maps of where he has sailed. Photo by: Susan Button



A wonderful time shared with the enthusiastic staff at the Treworgy Planetarium. Left to right: Tom Button, Susan Button, Bruce Levine (presenter), Bill Michael (longtime volunteer), Jeff Dunn (planetarium director) and Colby Button (our grandson). Photo by Susan Button

ceive special attention from the volunteer staff technician, who even removed the back panel of the console to show him how everything is controlled!

For more, visit www.mysticseaport.org/visit/explore/planetarium.

Livefest and MAPS 2013

What a marvelous time participants had in Frederick, Maryland at the July meeting of the Middle Atlantic Planetarium Society (MAPS) conference. Thank you Jeff Grills, Mark Bowman and all the staff from the Earth and Space Science Laboratory for providing such an awesome experience!

The conference week started off with a special free day called "Livefest." And, thanks to some wonderful presenters who donated their time and energy (and the cost of an extra night at the hotel), we did have a "fest" of sharing live interactive techniques and thought-provoking discussions.

Thank you Alan Davenport for conceiving of this extra day, and to the MAPS board for sponsoring it. Thank you also to my tal-

ented presenters, Greg Anderson, Steve Berr, Francine Jackson, Ken Miller and Kim Small, and to all the delegates who attended.

One important thing I discovered was that I needed to provide more time for discussion and less "planned" presentations because the attendees really needed more time to talk about everything.

The day began with a discussion about the clients we serve. We talked about some stages of learning by examining Piaget's findings about child development. Piaget divided the learning stages into four groups:

- The Preoperational Phase (2-4 years), egocentric language, beginnings of imaginative play and ability to talk about objects that are not present.
- The Intuitive Phase (4-7 years), more social language skills, form crude concepts that are hard to reverse, simple observations focused usually on one aspect of an object or event, intuit logical concepts in some areas.
- The Period of Concrete Operations (7-12 years), less egocentric, can do concrete problem solving, beginnings of organized logical thought.
- The Period of Formal Operations (12 years and onward), thinking becomes less tied to concrete reality, more abstract thinking with principles of formal logic.

We noted that there are exceptions to these age groups and sometimes even older students and adults need to first operate at the concrete level before they can move on to abstract thinking. To

(Continues on Page 58)

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Top: A very lively group of teachers and planetarians at "Livefest," which preceded the annual MAPS conference. Below: Mark Bowman and selected MAPS members demonstrate the "Life and Death of Stars." From left, they are Mark Bowman, Francine Jackson, Dayna Thompson, "Medusa" Patty Seaton, and April Whitt. Photos by Susan Button

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learn more, go to childdevelopmentinfo.com/child-development/piaget.shtml.

We then looked at styles of learning by examining Howard Gardner's multiple intelligences theory. Karrie Berglund helped with this by providing information that explained Gardner's proposed nine intelligences that include: Linguistic, Logical/Mathematical, Musical/Rhythmic, Bodily/Kinesthetic, Spatial, Naturalist, Intrapersonal, Interpersonal, and Existential.

For more information, go to www.pbs.org/wnet/gperf/education/ed_mi_overview.html.

Some discussion ensued about whether this theory was correct or not. Some agreed with the theory and others said it did not matter how students learn, we should not have to cater to these different styles. These folks thought that the onus should be on the student to take charge of their own learning by knowing how they learn best.

In spite of that, we talked about how we are already doing many things to address different stages of development and ways people learn, and people were interested in building on this more intentionally.

Vary presentation toward learning

The general consensus was that we do need to make our presentations varied enough so that we reach each individual on some level. We already appeal to the visual learner by the nature of planetariums.

All groups respond well to music, and inter-

active presentations best serve all of the stages and styles of learning. We agreed that we at least need to keep in mind the following grouped styles and preferences:

- Visual (spatial): prefers using pictures, images, and spatial understanding.
- Aural (auditory-musical): prefers using sound and music.
- Verbal (linguistic): prefers using words, both in speech and writing.
- Physical (kinesthetic): prefers using body, hands and sense of touch.
- Logical (mathematical): prefers using logic, reasoning and systems.
- Social (interpersonal): prefers to learn in groups or with other people.
- Solitary (intrapersonal): prefers to work alone and use self-study.

Next, Kim Small helped us to look at ways of develop-

ing lesson plans using a technique currently called Backward Design, which is designing a lesson or curriculum by starting with goals and assessments first.

Kim likened the process as similar to baking; you know the results you want and how the assessment will be done and then, with that in mind, you get the recipe, gather your ingredients and begin mixing and baking.

The steps for Backward Design (or Understanding by Design) can be listed as the following:

Stage 1: Identify desired results (outcomes, goals, standards)

Stage 2: Determine acceptable evidence (formative and summative assessments)

Stage 3: Plan learning experiences and instruction.

Kim explained "The (United States) Next Generation Science Standards (NGSS) lend themselves to an Understand By Design model. NGSS Crosscutting Concepts provide connections to 'Big Ideas.' The NGSS Disciplinary Core Ideas provide 'Standards' and 'Understandings.' The Core Ideas are written in a way that fits nicely with the backwards design framework."

Then she went over a sample lesson that she created:

- Big Idea—Patterns and Natural Phenomena
- 2. Standard—Earth's Place in the Universe
- Understandings—Students will understand that the orbit of the Earth around the sun, together with the rotation of Earth about an axis between its north

and south poles, cause observable patterns. These include day and night, daily changes in the length and direction of shadows, and different positions of the sun at different times of the year. Students will know that the length of the day varies based on the season and that this is directly related to the sunrise and sunset directions and the noontime sun position.

- 4. Essential Questions—How does the length of the day change throughout the year? How does the tilt of the Earth relate to the change in the length of the day throughout the year?
- Students will be able to: Represent data in graphical displays to reveal patterns of daily changes in length of the day and night.
- 6. Sample of Performance Tasks:
 - Complete a web investigation of the tilt of the Earth in space and how this affects seasons.
 - Complete a table identifying the sunrise/ sunset directions and noontime sun positions for the first day of each season.
 - Create an "accelerated daily journal" of the sunrise and sunset times and calculate total "day" time for twelve different dates throughout the year.
- 7. Learning Activities:
 - Investigate Earth's tilt in space.
 - Sunrise/sunset and noontime sun position activity.
 - Length of day activity.
 - Watch the seasons clip from *A Private*
 - Model the Earth and sun during each season.
 - Graphical representation using data collected in activities to describe the patterns observed in changes of the length of the day.

The contact for more information on this topic is Kim Small at ksmall@udsd.org.

Focus on specific topics

After the morning's discussions, we started to tackle some more specific topics. Francine Jackson shared her experience and thoughts on light trespass. She reminded us, "One of the more important parts of our profession is the awareness of the night sky; unfortunately, we are deluged with excessive light."

Francine urged us to be aware of our need to inform the public about the most cost effective lighting techniques, apparent resultants of light excess and to connect with local amateur astronomy groups to promote better lighting practices in our communities. Contact Francine Jackson at francine_jackson@brown.edu.

Next was a presentation that I developed for the International Year of Astronomy in 2009, on how a "seasons" lesson could be varied by using stories from around the world.

Start with one or two stories about how the sun was created and how many have similar elements. Then, after collecting data about the seasonal sun's path, a story can be told about a seasonal constellation for the transition from day to night.

For creation stories, I suggest "Raven Steals the Light," a story shared by many northwest coast Indian nations in the United States and Canada. The Egyptians have a story of how on the first day, over the first dry hilltop, the first sunrise occurred.

For evening of the vernal equinox, try "Fisher Goes to Skyland" from the Anishinaabe Tribe near the Great Lakes (Fisher is represented by the stars of the Big Dipper).

For the evening of the summer solstice, I suggest "The Cowherd and the Weaving Maid" from China/Japan, which is illustrated by the star Vega in Lyra, the harp, and Altair, in Aquila, the eagle.

For the evening of the autumnal equinox, there is "Celestial Funeral Bed" from the Hindu Lunar Zodiac; the bed is the Great Square of Pegasus.

Finally, for evening of the winter solstice, there is "Te Waka O Aitua, The Canoe of Fate" from the Maori of New Zealand. Makali'i, the Pleiades, is the bow of the canoe, the belt of Orion is the stern, and the Hyades formsthe sail. The bright star Sirius is sometimes said to "guide the canoe" as it sails along the Milky Way.

Steve Berr shared some unique ideas/activities that he has gathered through years of teaching interactive lessons. For example, he provided a chart that allows you to build a scale model of the solar system using the standard-sized portable dome as your model Earth or sun. You can contact Steve at sberr@bee.net

Greg Anderson presented "StellarLunar," an activity written by Karrie Berglund of Digitalis Education Solutions, designed for an audience of upper elementary students. In the activity, students are briefly introduced to the night sky, and instructed about how to determine direction in the dome using the north star.

Attention then turns to the moon. Students are asked to determine the current phase. Then the moon is magnified, and the challenges of determining the phase while the moon is not magnified are discussed. Contact for Greg Anderson: greg@cosmic-adventures.com

Ken Miller presented a workshop during which participants learned (or re-learned) two activities from the "Explorers of Polynesia" program released 16 years ago. A group dynamic using star charts built a "whole-sky model," and north star observations helped the group navigate 3,000 miles of open ocean to "live or die" as navigators. Contact for Ken

Miller: gotousa@earthlink.net.

Finally, as a group, we brainstormed to come up with a list of resources for classroom teachers. We made a list that included our favorite resources under the following categories: organizations, publications, software, commercial show packages, listserves, websites; apps and YouTube videos. I will eventually, after it is annotated, make a copy of this list available on the IPS Portable Planetarium Committee webpage at www.ips-planetarium.org/?page=portablecom.

We toured the Robinson Nature Center in Columbia, Maryland, a LEED (Leadership in Energy and Environmental Design) facility, we found a living roof on a large section of the building and learned more about how the center conserves energy and water.

We also experienced some more interactive activities, new astronomy lessons and curriculum in the Naturesphere, a 24-ft dome equipped with a Spitz SciDome. Joel Goodman was our host and Spitz, Inc. generously provided our lunch and demonstrations.

When the actual conference began and as part of the official welcome, Jeff Grills, our host at the Ausherman Planetarium, played his guitar and sang to us!

Throughout the conference we were treated to many fun interactive experiences, such as three scavenger hunts, a constellation competition, educational workshops, short demos under the dome from members, and no con-

current talks.

Kyle Doane and Kenya project

• Congratulations to another of our inspired colleagues. Kyle Doane, following in the footsteps of Dave Weinrich's project in Ghana, has initiated a project to set up the first portable digital planetarium outreach program in Kenya. (See story on page 16)

Kyle explains that the planetarium will be run by a group of Kenyan astronomy educators and business people, who will operate it in a sustainable way. He revealed that the projection system was donated by the Perot Museum of Nature and Science in Dallas (www. perotmuseum.org) and was refurbished and upgraded by Digitalis Education Solutions (digitaliseducation.com).

I am following Kyle and this wonderful project on Facebook; he is in Kenya as I write this. To learn more and to donate to the project, go to startsomegood.com/NomadDome-Kenya or contact Kyle directly at nomad-dome@googlemail.com.

Signing off

So, this has been a very interesting and exciting time of the year! I look forward to a trip to IPS Council in Italy in August and to learning more about activities in other parts of the world. If I do not see you there, please write with news of portable and small planetariums in your region!

Italia: it was divertentissimo!

Patty Toth Seaton Howard B. Owens Science Center Lanham-Seabrook, Maryland

Being able to participate in the IPS American Planetarium Operator in Italy program was absolutely divertentissimo—"it's a lot of fun"! I learned so much by being able to travel to another country and do what I love to do most: teach under the stars. But let me back up first.

I've known about the program for years. Each Middle Atlantic Planetarium Society (MAPS) Conference, when Susan Button would announce the opportunity, I'd think to myself, I'll have to apply someday. But I didn't have a passport. Or I was too busy. I'm a single mom. Whatever excuses you could think of, I used them to keep from applying.

And then something happened to change everything: IPS 2012, in Baton Rouge, Louisiana. For once I carried the MAPS vote myself, rather than take the easy way out and use Lee Ann Hennig as our proxy.

As a result, I arrived in Baton Rouge two

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In Cagliari for the XXVIII Meeting dei Planetari Italiani, with hosts Loris Ramponi and Simonetta Ercoli. All photos either by or provided by author

Italy, continued from Page 59

days before the delegates to participate in the Council meeting. Here I met representatives from all over the world, and suddenly, I found a kinship with my planetarium colleagues on a global basis.

I was perfectly comfortable in the MAPS region, and even with SEPA and GLPA, with whom we had shared joint conferences in the past. I had even ventured out to participate in the Western Alliance of Planetariums (WAC), and made friends with colleagues pretty much across the United States.

Now my worldview had expanded beyond just meeting vendors from other countries. I was now sharing with vendors and colleagues.

Could I be brave enough?

Coming out of this conference, I felt inspired to finally apply for the Italy program. After all, I had sat next to Simonetta Ercoli of Perugia, Italy, at the council meeting and already found a friend there. Could I actually brave leaving the comforts of the United States and teach in another country?

My first challenge was designing a lesson plan that would be appropriate for all types of planetariums, as I knew that I would be teaching with a STARLAB and some fixed projectors. Most of my favorite lessons required a quick change from the northern to southern hemisphere, and using the sun and the moon, which was a little more challenging with only an hour in the STARLAB.

So I finally decided to teach a typical astronomy lesson, using the theme of Harry Potter and tapping into popular fiction. I found out from Simonetta that Harry Potter was, indeed, as popular among Italian students as it is among students in the United States.

Surprisingly enough (at least to me), this twist of teaching through the lens of popular fiction was the deciding factor in the review panel, and I was to head to Italy in April.

My school system approved the days of professional leave, and on April 10, my Italian adventure began in Rome, where I found the bus station at the airport and took a bus to meet my first host, Simonetta Ercoli, in Perugia. I nearly panicked when I discovered I was to change buses, but the bus driver took care of the American who knew only a few polite words in Italian.

Simonetta met me at the bus station in Perugia, and we went to dinner that night with a team of students and one teacher who all worked in the planetarium.

They made me feel right at home, as I began the very next morning with three "projections" at 8:30, 10, and 11:30 a.m. These students were particularly interested when I introduced exoplanets to the discussion, so I used my iPad and briefly ran through the exoplanet app (exoplanetapp.com) with them.

The teachers were as fascinated as the students.

That afternoon I had a workshop with a few teachers, where I not only discussed using popular fiction to teach astronomy, but ran a simple activity I call Constellations and Cultures."

In this activity, I divide a star chart into four regions, assign a region to each of four people in a team, and have them design their own constellation, name it,

and write a story using all the constellations. Each team presents their story of the sky. Note that all teams use the same region of the sky, which leads to a discussion as to how different cultures developed different constellations and stories for the same part of the sky.

In this lesson, I added the twist of telling each team what type of culture they were: one was a hunter-gatherer culture; one was an urban culture.

Teaching the Hogwarts way

After the workshop, I adorned the room with my Harry Potter decorations: a wall tapestry of the Black Family Tree, a picture of Ariana for the planetarium door, a Hogwarts 9¾ sign for outside, and even a Moaning Myrtle for the girl's toilet.

It was a low attendance, and I had actually almost lost my voice at this point, but we all had fun. Even a lady who spoke no English conveyed that she was able to follow my constellations outlines, so, yay!

I happened to be in the right place at the right time to become involved in the "Looking for Walter" project. A doll which represented Walt Disney had been sent to a group of students, and they were given clues to figure out who the doll was supposed to be.

The students interviewed me, and I got to help give them some clues about how to use the sky to help them find their way to America

I also showed them how to find Vega in the sky, a star chosen to have special significance with the wedding date of Walt Disney (the dates had been given to the students, but not the significance).

This project was also a lot of fun. This interview happened on my second day, where the schedule was not quite as tight as the first. I even had a chance to have a lovely breakfast with Simonetta, who had invited me to stay in her home while I was visiting Perugia.

That afternoon we got to explore downtown Perugia, which fascinated me with its





Top: Perugia Teachers involved in Constellations and Cultures workshop. Bottom: Harry Potter Night in Perugia, with Simonetta Ercoli. Photo by Abde El Hilali

different levels of history, from medieval, to Roman, to Estrucian. Then we picked up Walter (the human, not the Disney doll) and headed to the airport for the next stage of our adventure: Cagliari in Sardinia.

At the Planetari Italiani meeting

Cagliari was hosting the XXVIII Meeting dei Planetari Italiani, the Italian Planetarium conference. We arrived late, but managed to join the other delegates for a late dinner. The next day the group had plans to take a one hour bus ride to a radio telescope and then to an archaeological ruin site. While that sounded interesting, my next host, Loris Ramponi, offered to take me on a walking tour of Cagliari instead.

I happily agreed to expand upon the Italian experience, and was greeted with my first glimpse of the ruins of an ancient Roman amphitheater. It was amazing. We spent hours in the Archaeology Museum, viewed the art museum, and eventually joined the rest of the delegates for an evening at the planetarium.

I was impressed to see the fully hybrid op-

tical-mechanical/digital Zeiss system that was in place, and especially enjoyed the live lecture demonstration given with the system. The next day we enjoyed more presentations, and I got to speak briefly about my experience.

Even though most of the presentations were in Italian, I appreciated taking part and seeing other organizations "in action." Serving on the board for MAPS for many years and twice a host for the MAPS Conference, I could appreciate all of the work that went into the preparation for this conference.

Off to Brescia

Sunday afternoon was to the airport again and off to Brescia with Loris. That evening

we ate real Italian pizza in the home of Emma and her son, Stefano, who are friends with Loris.

Monday was a day of exploration. I got to see the two observatories that Loris works with, one in Brescia at the Castillo, and one in Lumezzane. They were very impressive, and both also had small planetariums that were used in the lecture-rooms.

That evening was very special, as we again had dinner in the home of Emma and Stefano. Stefano played a personal concert for me on the piano;

he is quite an accomplished musician.

On Tuesday, Wednesday, and Thursday, my "lectures" were performed in the STAR-LAB, three each morning (four on Thursday), as the schools were over by early afternoon. Loris had the students write sentences summarizing their experiences, and one day, had the students read their sentences into a voice recorder.

I enjoyed keeping those summaries and learning from them. My favorite comment from a student was "It's amazing to see the universe and not just to study it."

This kind of hit home to me, because I found in talking with different students—the ones who worked with Simonetta in Perugia, a graduate student who worked at the observatory in Lumezzane, Loris's 16-year old son—all of them mentioned that their learning was strictly theoretical and that they never (or rarely) did any hands-on learning.

The graduate student said that he was an engineering student, and could tell you everything you needed to know on how to build a circuit, but had never actually built one. This apparently is true throughout Italy, and is strikingly different from my own school district's teaching philosophy, especially in science.

At home, we are implementing more student-driven experimental projects, where teachers become true facilitators rather than the lecturers. I think the Italian students would like this model.

My Tuesday evening was especially interesting, as I got to attend a press conference in Lumezzane during which the observatory presented information to the vice mayor. They made a big deal of presenting me, although again, the majority of the conference was in Italian. I learned to listen for context rather than words, probably the best way to learn another language.

That evening I dined with friends of the observatory, and enjoyed the warmth and fellowship of the Italian people. We ate at the



Patty before a student group in Brescia. Photo by Loris Ramponi

church right next to the observatory and spent a great evening with the public at the observatory. My Brescia experience was complete with exploring the many squares and then the many amazing chapels.

Gorizia: the final leg

The final leg of my journey took me to Gorizia. Loris set me on a train, where again I had to change trains by myself (yikes). I met

up with Luciano, my next host, who assured me, in reply to my anxious texts prior to my arrival, that "Americans are easy to pick out." Sure enough, we met with no problem, and I was off to meet his wife, and then to visit the observatory/planetarium where I would be teaching.

I was impressed to discover that this observatory has discovered more than 270 minor planets. I watched as the volunteers studied images from their telescopes using the blink comparator method (how Clyde Tombaugh discovered Pluto). They didn't discover anything new that night, but I loved being a

part of "live" science.

That Friday, Luciano took me on a tour of WWI battlefields in Slovenia. It was really interesting to hear about the war from the point of view from another country and to learn how the border between Slovenia and Italy had really only just been opened in the last 10 years. That evening, I gave a public presentation to members/friends of the observatory. Divertentissimo!

Learning about the sundials

We had the weekend to explore. On Saturday, I got to spend the day with Franco and Enrico. Franco Bressan was one of the originators of the sundial project of the city of Aiello. There literally are sundials on every corner in this project that started as a school learning experience.

But what fascinated me most was the equipment that Franco had helped design and had built to teach students about how the shadows will fall on Earth from different latitudes, and at critical times of the year. It was impressive.

We also explored Palmanova (the star-shaped city), the archaeological museum in Aquileia, and Grado, where I got to touch the Adriatic Sea for the first time.

On Sunday, I joined Luciano and his wife on a trip to explore the caverns of Skocjanske jame, in Slovenia. They put the Luray caverns to shame. At one point, I swore that I was on the set for the *Stargate* episode "The Crystal Skull," when we walked over a very high bridge in very low lighting. It was amazing. We drove 40 km to where the river from the cave reappears.

We met with the Friends of the Observatory for a lovely dinner in Slovenia, where I felt like a royal guest. I was told that one version of Jason and the Argonauts (stories we probably all tell under the dome) puts them on the very river I visited that came from those caverns.



Learning about the Sundial Project with Franco Bressan and Enrico Pettarin

Monday I got to teach my first students in Gorizia, with Luciano driving the Digitalis projector he has on site. Their planetarium is very interesting. It is technically an inflatable dome, housed inside a permanent structure.

Anyway, it was fun to have some of the features of a digital planetarium, as Luciano picked up on my cues and flew out to various nebulae as I discussed star birth and death. Then he ran a 20-minute digital show for each group following my presentations.

That evening we visited the WWI Memorial. It was impressive and powerful. I climbed all 336 stairs to reach the top, even though it was raining. I needed to get the full experience and I felt the powerful tribute that was raised in honor of the Italians who died in that war.

On an early Venice train

On Tuesday, Luciano had graciously combined two classes into one morning class so I could catch an earlier train to Venice. He wanted me to spend some quality time there, since I was flying out of Venice the next morning.

This final gesture summarized my entire experience in Italy. Yes, I got to do in Italy what I love best: teaching under the stars. Yes, it was a challenge for me to speak slowly so the English learners could at least understand

most of what I said. Yes, I picked up on some interesting differences in our educational systems.

But most importantly: I learned that when you are in Italy, you are immediately family. Each host treated me as such. I was never seen as a "burden."

Even at the restaurant in Slovenia, the waiter presented "the American guest" with a special bottle of vino to take home.

I loved how in Perugia, I was welcomed into Simonetta's home. We had breakfast as family, not as guest/host.

In Brescia, I was warmly invited into the home of Loris's best friend, and given that

magnificent piano concert. In Gorizia, I was welcomed into the home of Luciano, felt immediately like part of the Friends of the Observatory, and even made fast friends with the family dog, Lucky.



Patty with the observatory crew in Gorizia: Enrico, Luciano, Piero, and Franco. Photo by Enrico Pettarin

That's how I felt about this experience; lucky to have been given the opportunity. No, that's the wrong word. I was blessed. The world was opened up to me at IPS. In Italy, my family grew that much bigger.

Student one-sentence reflections (kept as written by the students)

"Everything has a spirit."

A beautiful experience! She inspired me and makes me curious about everything she has said; she was very involving and has kept my attention all the time.

It is a fantastic experience, full of curiosity. It makes you excited about the space. And she is excellent! I found it interesting and funny too.

I am very interesting at start, because I think there are magic and fascinated. I just know something about stars but however I appreciated the references to poetry and to HP mythology (story). It was very interesting and funny.

It inspired me, so I think the aim is reached! Good luck for your researches!

I found this experience very useful and interesting. Very surprising and interesting. I have found it useful for our studies, but also to learn something new

and lots of curiosities.

Very interesting the Harry Potter interpretation!

The speech was very interesting because I love Harry Potter's stories.

It surprised me that scientists goes in the schools to inspire people.

A beautiful experience, thank you!

Very interesting. I've read Harry Potter's books and I discover a lot of funny things about it.

I liked to see the stars from another point of view. I was struck by the stories of the stars that are differ-

ent from the Greek ones that we know.

It was a very interesting experience that helps us to learn about the stars using modern literature as "Harry Potter" (and so to ????)

It was great. It was interesting and easy to understand. Well done!

It was a very interesting and particular experience. It impressed me a lot.

It was a great experience: it was interesting to see

how stars fascinate everybody even writers. Moreover, I think that learning in this way is easier and more interesting. It would be great if the same thing was done also here in Italy.

Learning things that way is great. I only wish there were more chances to experience these unconventional teaching methods.

Sky has always been a mysterious place where "painted" fighters and animals live together. Even if it is not real, it can continue to tell us beautiful stories!

I think it was a very relaxing experience; being there in the dark surrounded by stars was very interesting, especially when they were rotating.

I've got a star on my hand.

Great experience! Observing the night sky and discovering stars and constellations inside the planetarium was fascinating and really funny.

I'd have never thought stars could be this interesting!

It was a beautiful experience because it's very difficult to see the stars in a city, and I could see all them in my school.

I was very interested by your life and I appreciate you!

I really loved this experience.

It was a very exciting experience!

It was an interesting experience discovering the features of the stars!

Amazing experience!

It was a very interesting experience.

Fantastic experience!

It was a great experience because I discovered a lot of things that I didn't know before.

It was a beautiful experience in particular love the presentation of the Milky Way.

The stars are guides of travelers.

Awesome!

Stories of the stars represent our emotions.

The great connection between Harry Potter and the stars.

Same stars different stories.

Stars are the world's mirror.

We loved this experience! We are finally able to recognize the stars in the sky this summer we certainly go to the observatory.

Everything can tell a story, and the story of the stars is one of the most interesting and beautiful one.

It has been very interesting. We learnt a lot about the stars. We discovered things we didn't absolutely know and from now we will be able to recognize the stars she showed us.

The darkness in the planetarium was too much and for this reason the stars couldn't be seen easily. But the lesson was very interesting.

I really enjoyed the relation between astronomy and literature.

It has been funny and interesting.

I liked the idea of introducing the universe by public fictions.

Look at the stars makes me think about what surrounds me.

To see the universe closer than early was a very amazing and interesting experience.

Super idea to mix fiction and astronomy.

We are made not to live on the moon, but on the earth.

It was beautiful and I was surprise how the stars can influence the names of some characters in the books.

The universe in a different way, it's been a wonderful experience.

It was beautiful mixing Harry Potter with stars.

It was beautiful discover where Rowling took the name of her characters.

I liked the relation between characters and stars.

It was beautiful to explore the infinite universe. \$\times\$



Book Reviews

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The One-Minute Astronomer: Tips, Tales and Tours for the Casual Stargazer

The Editors of One-Minute Astronomer, Mintaka Publishing, Inc., Ottawa, Ontario, Canada; Amazon Kindle eBook, 2012

Reviewed by Woodrow W. Grizzle III, Elizabeth City State University Planetarium, Elizabeth City, North Carolina, USA.

The One-Minute Astronomer is a website (www.oneminuteastronomer.com) devoted to making astronomy accessible to the public.

Started in 2008, it is published by writer and amateur astronomer Brian Ventrudo of Ottawa, Ontario. Ventrudo has published many articles about various astronomical topics on the site in order to "help beginning and casual stargazers all over the world learn more about the night sky and better understand our place in the universe."

There are also guided tours of the night sky and a mailing list that people can join to get regular updates via email.

From the editors of the One-Minute Astronomer website comes *The One-Minute Astronomer: Tips, Tales and Tours.*

The book is divided into three eponymous sections, and it contains over 110 articles "that will inform, inspire, and intrigue you, whether you're an experienced stargazer or a beginner."

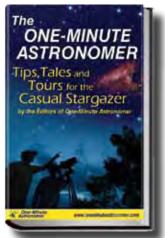
The language is clear and informal. There are ample photographs and diagrams to illustrate the point. Rarely does a book come along that is at once both factually dense and a page turner, but this one shines as one of those exceptions.

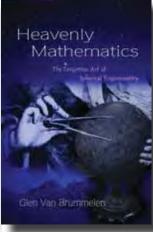
The book starts out with the tips section, which is an introduction to observing the night sky. It begins by introducing concepts like dark adaptation, averted vision, celestial coordinates and using hands to estimate altitude angles.

There is also a discussion on binoculars and telescopes that includes a compelling argument against department store telescopes and buying any telescope right away: a notion with which every planetarian should be familiar.

Next are tales. These are all about astronomers famous, infamous, or forgotten. There are some real gems in this section, including the tragedy of LeGentil and the Transit of Venus, which may well be the saddest, most dramatic tale in all of astronomy.

The third section, tours, is what makes this book remarkable among its ilk. Here, difficult and complex concepts are delivered palatably





and with a skill of effectiveness I have rarely seen. It effortlessly blends science with history to answer not only "what," but also "how" and "why" these astronomical understandings matter.

There were a few times when I read something that I had forgotten from my days as an astronomy student, so the book makes for a great refresher. In fact, I highly recommend this book to planetarians who have had no formal astronomy education. Readers can learn a lot fairly quickly from this one.

As great as the tours are, I must take great issue with one point: the book's repeated reference to stars "burning" their nuclear fuel. While some readers may know well that the author is talking about nuclear fusion, combustion is, nonetheless, a far different process.

It is true that astronomers often use terms such as the "carbon-burning process" or "neon-burning process" in scientific literature regarding stellar evolution, but such a characterization is somewhat of a misnomer that has great potential for instilling or reinforcing a misconception. Stars are not on fire. Nothing is perfect.

Heavenly Mathematics: The Forgotten Art of Spherical Trigonometry

Glen Van Brummelen, Princeton University Press, 2013

Reviewed by: Bruce L. Dietrich, Wyomissing, Pennsylvania, USA.

What was once a standard academic high school math course has been obliterated from the modern curriculum. Despite the primal utility of this subject in astronomy, architecture, and space flight, curriculum writers have failed to note just how their own intellectual GPS works!

The last high school text available was written in 1966. Not to worry—Dr. Brummelen has written one math book which stimulates both sides of the brain.

He allows us to understand just how Antoni Gaudi, Bucky Fuller, and all of us now toiling under a variety of hemispherical sections benefited from the discoveries of Eratosthenes of Cyrene, Ptolemy, Menelaus, Napier, Euler, Delambre, Cesaro, Sumner, Wheeler, et al.

Glen Van Brummelen is a Canadian historian of mathematics specializing in historical applications of mathematics to astronomy. He earned his PhD degree from Simon Fraser University in 1993, and served as a professor of mathematics at Bennington College from 1999 to 2006.

He then transferred to Quest University Canada as a founding faculty mem-

ber. Van Brummelen is a former president of the Canadian Society for the History and Philosophy of Mathematics.

From an engaging preface in which he shows how to use the text and suggests several really helpful learning aids, through his masterful recounting of this fascinating history replete with beautiful illustrations, and ending with challenging exercises, Dr. Brummelen has written a keeper.

Measurement

Paul Lockhart, The Belknap Press of Harvard University Press, 2012

Reviewed by Woodrow W. Grizzle III, Elizabeth City State University Planetarium, Elizabeth City, North Carolina, USA.

I was someone who struggled with calculus in high school, mostly because I did not understand the point of what we were doing. I later resolved to teach myself calculus because I knew it could not be that difficult, but that the teachers I had were either poor communicators, or they lacked sufficient mastery of the subject to effectively teach it.

It was out of this trifle that I found myself drawn to Paul Lockhart's new book, *Measurement*. I came expecting to learn something; I never expected a complete revolution of

thought, but that is exactly what I found.

Paul Lockhart teaches mathematics at Saint Ann's School in Brooklyn, New York. He is the author of *A Mathematician's Lament,* which the front jacket fold of *Measurement* describes as an "impassioned critique of K-12 mathematics education."

With mathematics education reform being one of my own passions (also because I once struggled), my interest was instantly piqued. Before reading more than the front jacket fold, I sought out *Lament*.

This primal work began life in 2002 as a 25-page essay, which was distributed as type-written pages, and ultimately onto the internet, where it flourished in the mathematics underground before being developed into a short book in 2009.

The original essay is available for download at www.maa.org/devlin/LockhartsLament. pdf, and the 2009 book is available wherever books are sold. I found it gratifying to read the essay before I read *Measurement*. The new book is certainly capable of standing on its

Measurement is a more lengthy tome than *Lament*, at 398 pages, and, though the subject

matter is similar, Lockhart climbs down from the soapbox in *Measurement* to give abundant examples of his philosophy of mathematical discovery.

He serves as tour guide into a wonderful world of abstract thought throughout the book's two sections, each with 30 chapters, which are really different thought experiments.

In each, Lockhart introduces a new mathematics concept and

leaves the reader with a problem to solve. These concepts build cumulatively throughout the book, ideally leaving the reader with a good understanding of math principles and,

Measurement

PAUL LOCKHART

hopefully, inspiration to sally forth into the world to further explore.

At first blush, that might sound like an ordinary math textbook. Lockhart's approach, however, is different. Instead of mere repetition, his approach is to stimulate the creative mind to conceptualize what are, at times, rather complex mathematical concepts.

The two sections, "Size and Shape" and "Time and Space" deal with geometry (both plane and solid) and calculus (both integral and differential), respectively. Many of the concepts introduced are quite challenging, though Lockhart's style never threatens and always invites.

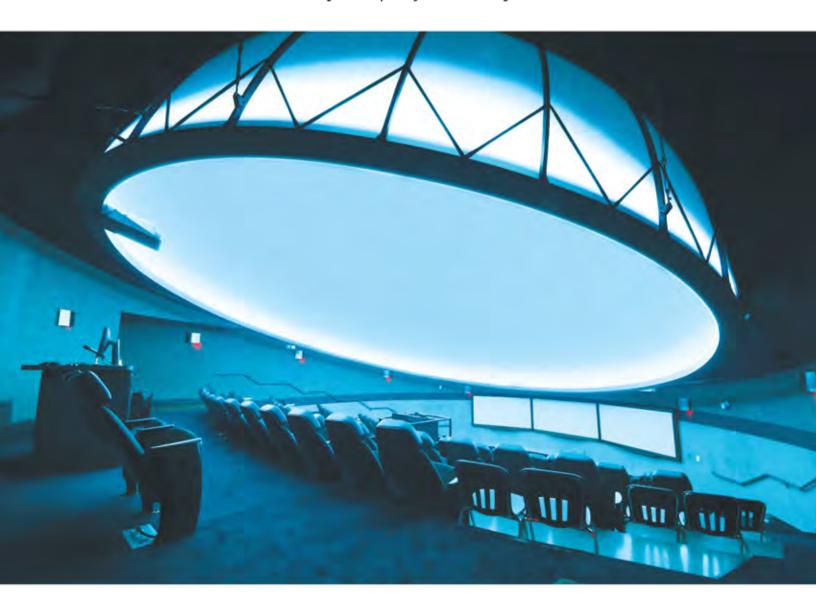
Lockhart's eloquence reflects his absolute mastery of the subject matter. He presents each idea in a conversational way that reveals more than lectures and that could be far more effective in classrooms than the "blindly follow instructions, it works this way because I said it does" way in which math is currently taught in most schools today.

In addition, each of the book's 60 sections ends with questions intended to fuel the fire of further thought on the part of the reader.

As someone who struggled with higher mathematics until finally teaching himself after school, I can speak first-hand to the power that Lockhart's method has. While reading it, I often came across validations of my self-study and I learned some new things, too.



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Waxing New

An eclectic collection about planetariums, products and people compiled by Sharon Shanks





Changes at the top at Fleet

Dr. Jeffrey Kirsch has retired as executive director of the Reuben H. Fleet Science Center, San Diego, California, effective June 30, 2013. Kirsch, former chair of the Giant Screen Cinema Association (GSCA), is recognized as a pioneer and major contributor to the production and exhibition of IMAX® films in science museums, and he has changed the face of science education in San Diego.

According to a press release from the science center, he is looking forward to his next project, serving as consulting producer on a film about the Panama Canal, now in the planning stages but aimed to debut as part of the Balboa Park 2015 Centennial.

The new executive director is Dr. Steven Snyder, who moves to San Diego from Philadelphia, Pennsylvania, where he was vice president for exhibit and program development at The Franklin Institute.

ASP recognizes Williams, Bueter

Two well-known names in the Great Lakes

Planetarium Association region were among recipients of the 2013 awards for excellence in astronomy research and education at the recent Annual Meeting of the Astronomical Society of the Pacific in San Jose, California.

Gregg Williams, planetarium director at Merrillville Community Schools (Indiana) for the past 30 years, was awarded the Thomas J. Brennan Award for exceptional achievement related to the teaching of astronomy at the high school level.

According to the ASP, Williams "has made a point of including everyone he can in the production and presentation of planetarium shows. The planetarhe also engages students in the classroom."

Chuck Bueter of South Bend, Indiana, described as an "independent informal education professional" by the ASP but best known to planetarians as the outspoken and enthusiastic force behind transit of Venus popularization and paper plate astronomy, received the Las Cumbres Amateur Outreach Award for outstanding outreach by an amateur astronomer to children and the public.

"Most recently, his passion for astronomy culminated with the Transit of Venus in 2012, where he orchestrated dozens events in preparation for the event. His efforts resulted in thousands of children and adults viewing the transit with excitement, and became the cover story of the March 2012 issue of Planetarian, the journal of the International Planetarium Society.

"He also worked with a local planetarium director to organize a program called Let There be Night, during which more than 3,000 student from 14 schools learned about the problems of light pollution from handson research and activities."

Other awards were presented to:

Dr. Charles Tolbert, professor at the University of Virginia for more than 40 years, the Richard E. Emmons Award for excellence in

ium is staffed by his students who are members of the astronomy club Williams sponsors. He invites other teachers to become familiar with the production of shows specific to their subject matter, including art and history. In addition to teaching technicalities of running an engaging and real-time planetarium show,

Gregg Williams (left), planetarium director at Merrillville Community Schools, and Chuck Bueter, "Mr. Transit of Venus," with their awards from the Astronomical Society of the Pacific.

college astronomy teaching. This award, established in 2006, was inspired by a gift from Jeanne and Allan Bishop. Jeanne is Mr. Emmons' daughter and a former president of IPS. She still serves the society as the IPS affiliate representative for GLPA.

Dr. Mary Kay Hemmenway, retired director of educational services in the department of astronomy at the University of Texas at Austin, the Klumpke-Roberts Award for outstanding contributions to the public understand and appreciation of astronomy; and

Dr. Gurtina Bresla. whose PhD dissertation at Harvard University "Are the Magellanic Clouds on Their First Passage about the Milky Way?" was selected for the Robert J. Trumpler award for a recent PhD thesis considered unusually important to astronomy.

Founded in 1889 in San Francisco, the ASP fosters science literacy through astronomy by serving professionals, educators and amateurs around the world, and engaging and inspiring current and future generations.

Only planetarium in Guam closes

The University of Guam Planetarium, Mangilao, closed its doors on June 30. It was a decision made by the university's administration.

Coordinator Pam Eastlick reports that she has been reassigned to the herbarium.

There are hopes that the planetarium community will learn more in the December Planetarian. In the meantime, please check the story at the Pacific News Center, www.pacificnewscenter.com, and search for planetarium.

From Pam's final newsletter: "The UOG Planetarium averaged an annual attendance of 10,000 people over the 20+ years since the new Spitz system was installed in 1992 and I became Planetarium Coordinator. I discovered two things very fast. There was no money to purchase shows and many of the commercially produced shows won't work here anyway because our skies are so different. So I started doing my own shows and produced over 80 shows in the last 20 years."

Out of the carriage house

The Erie (Pennsylvania) Planetarium is moving to new digs at Penn State University's Behrend/Erie campus. Starting in October, the projector and 20-ft dome will be housed at the School of Science complex, and Director Jim Gavio will become a Penn State employee.

(The history of the planetarium, which was located in the carriage house of a grand mansion in Erie that had become the home of the Erie County Historical Society, is featured in Under One Dome in the December 2012 Planetarian.)

The historical society, which donated the planetarium to the university, plans to renovate the carriage house and use it for anoth-(Continues on Page 68)

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Fulldome festival in Russia

"Reflections of the Universe," the first fulldome festival in Russia, will take place in Valentina Teresh-kova Cultural and Educational Center in Yaroslavl, Russia (above) October 21-21, 2013. Supporters of this international festival of planetarium fulldome shows include the Russian Planetarium Association and the International Planetarium Society. For submission forms, attendee applications and more information, please visit the festival website at www.festival.planetariums.ru, or contact Andrey Lobanov (almp@post.ru) or Yaroslav Gubchenko (gubchenko@fulldomefilm.org).

er purpose. "An on-campus planetarium will boost the science programs at Penn State Behrend," said John Magenau, interim senior associate dean for academic affairs. "It's a great fit for Penn State Behrend, where we already have a strong astronomy program," he said.

On the move

Ken Miller, GOTO USA liaison and former director of the Bishop Museum Planetarium in Honolulu, has moved from Hawaii to Indianapolis, Indiana. His new address is 5715 Susan Drive East, Indianapolis, Indiana, 46250. His email is unchanged: gotousa@earthlink.net.

Tim Florian Horn moved from Germany to the Morrison Planetarium at the California Academy of Sciences several years ago. Now he's back in Germa-

ny and the new director of the Zeiss-Großplanetarium Berlin (Germany).

Tim reports: "With a 23-m dome, it is one of the largest planetariums in Europe and probably one of the few remaining large analog theatres in central Europe.

"The planetarium is part of the foundation 'Deutsches Technikmuseum Berlin' (German Museum of Technology Berlin) which features the Museum of Technology, the Sugar Museum, the state-of-the art handson Science Center Spectrum, the Archenhold Observatory with the world's

longest telescope and the Zeiss-Planetarium."

Tim will be managing the planned transition of the iconic planetarium to a fulldome system, hopefully to be accomplished by early 2015.

Free fulldome resources

Youngstown (Ohio) State University's Ward Beecher Planetarium is partnering with

CosmoQuest to make available fulldome images that can be used for free by planetariums across the world.

The project is called Science on the Half Sphere and is a collaboration between Ward Beecher Planetarium and CosmoQuest, a virtual research facility that provides the public with many of the opportunities professional researchers enjoy in their universities.

Available is a collection of nearly 60 full-dome, fisheye-lens images of the Mauna Kea Observatories on the island of Hawaii for downloading for free. Also available are nine short time-lapse, full-dome videos.

Included are images from the Canada-France-Hawaii,

Gemini North,

and the James-

well telescopes

and the Har-

vard-CfA Sub-

millimeter Ar-

ray. The images

were taken as

part of a Na-

tional Science

Foundation re-

Ward Beecher

Director Dr. Pat

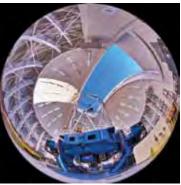
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awarded

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grant

Clark



The Gemini Telescope in Hawaii, photographed by and courtesy Pat Durrell

Durrell in 2009. The images are freely available to anyone who would like them to use in their planetarium shows or related projects. The images are available on the CosmoOuest website at

- cosmoquest.org/blog/scienceonthehalfsphere/mauna-kea-images
- cosmoquest.org/blog/scienceonthehalfsphere/mauna-kea-timelapses.

Console, continued from Page 4

for a content producer. He says it the best: "To illustrate what I mean I will enter into a small wager with you. I'll bet you can't find ten similar venues (in terms of size, format compatibility, price acceptance and content satisfaction) that will take my film at the price you suggest. If you can then it's a viable proposition for me to generate the product in exchange for a total of \$30,000 (i.e. around 0.075% of my production cost) and you will have won the bet. If you can't then I fear I will have made my point!"

Uncle! He made his point, and I thank him for making it.

An indirect response

Another response came indirectly, and I'm not sure if I can take credit for it or not. This one was from Jeff Bowen of Bowen Technovation.

He asked for help via Dome-L, among other groups, for input on age groups and curriculum needs for a new program on the electromagnetic spectrum.

That, if you remember, was one of my pleas from the June column: that show producers include people "from the trenches" early in their production process to find out exactly that information.

The consensus to his question, by the way, seems to be that light is discussed in various amounts in elementary and middle school, but doesn't get into the electromagnetic spectrum until high school.

Remembering why we do it

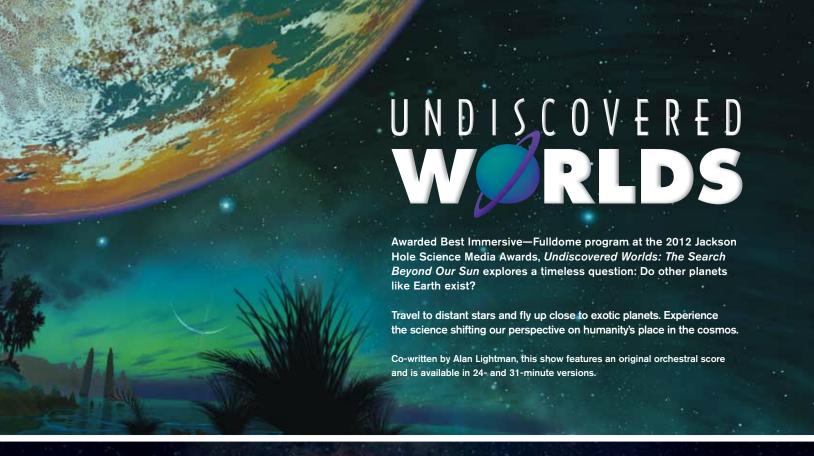
In 1997's he Demon-Haunted World: Science as a Candle in the Dark, Carl Sagan tackles some of the most depressing aspects of life in the United States, especially the decline of science knowledge and a loss of the ability to reason.

"The dumbing down of American is most evident in the slow decay of substantive content in the enormously influential media, the 30 second sound bites (now down to 10 seconds or less), lowest common denominator programming, credulous presentations on pseudoscience and superstition, but especially a kind of celebration of ignorance."

If we, as passionate planetarians and educators, simply throw our hands up into the air and quit, all that means is there are fewer fighters in the war against ignorance and the job is that much harder for those who are left.

We have to search for those flashes of understanding the the eyes of our audiences and hear those anecdotes about how our teaching has touched lives and molded careers.

With that scant positive feedback, we can, in spirit with Carl, continue lighting candles in the dark. \updownarrow







TWO SHOWS NOW AVAILABLE

from the Museum of Science, Boston

For more details and show licensing information:

David Rabkin, Director, Charles Hayden Planetarium, 617-589-0149, drabkin@mos.org

Shows distributed by:

Sky-Skan, Inc. 603-880-8500, sales@skyskan.com Spitz, Inc. 610-459-5200, mbruno@spitzinc.com

International, continued from Page 55

ium is part of the museum ticket. Our school shows are geared to the Ohio State Science Standards and we do the current night sky for all shows. Of about 30,000 annual paying visitors, we get about 15,000-18,000. This July we had 1,824 visit the planetarium.

Some 10 years ago I watched a demo of full-dome, and felt it was awful. A few months ago, I saw another demo of the current state of the art fulldome at the Great Lakes Science Center in Cleveland and I wanted it. Now. Blinded by the light.

I gathered many, many comments from Dome-L and elsewhere, shared them with staff, and entered into long discussions with our planetarians. We concluded, unanimously, that since most visitors did not even know how to find the North Star, and our opto-mechanical planetarium was functioning splendidly, we will continue as we have been for at

Alton Yarian, GLPA charter member

Alton Yarian died January 26, 2013 at the age of 103. Alton was the planetarium director at Lakewood High School in Lakewood, Ohio beginning in the 1960's.

He was also a Great Lakes Planetarium Association charter member, attending the 1965 meeting at Grand Rapids, Michigan.

David DeBruyn, the host of that meeting and GLPA's first historian, recalls "I'll never forget Alton Yarian's demonstration using a fisheye lens projected against the slightly domed surface of the Pantlind's ballroom ceiling."

Alton was a frequent writer for the NSTA journal, *The Science Teacher*. He was a recipient of one of the NSTA's top honors, the STAR Award, five different times.

Alton came to many of my Christmas parties. My husband Allan would pick him up and take him home, as his eyesight was failing.

He had a wonderful sense of humor, presenting me with a talking Christmas tree one year and handing out fake eyeballs to everyone in another. Younger people loved to talk with him and gain from his experience and gracious point of view.

Even at the end of his life, those at the Kemper Nursing Home honored him for his optimism and friendliness. We will miss this very fine human being.

Written by Jeanne Bishop; reprinted with permission from the GLPA Newsletter.

least another five years to see what happens to the technology and the price.

Having both opto-mechanical and full-dome would be great, but logistics preclude that in our space. We also agreed that we would not engage in offering non-astronomical programming, as there are so few venues doing what we do in this area.

A future grasp of fulldome

If and when we go to fulldome, we will continue to offer programs similar to that which we now produce. I already know that we will not employ all the whiz-bang features of the fulldome system. It is not either/or; it's what is the best tool to educate our patrons in the beauty and wonder of the night sky and the science of astronomy.

We also have found that the level of awareness of the scientific method and science in general is seriously lacking; or, even worse, that there is the presence of anti-science. My previous experience lecturing thousands of times in the social sciences still informs my lecturing today: because ignorance abounds, stick to the subject, refine and update, make it useful, and entertaining, and do this one thing very well.

Our consensus is that if one wishes to go to a movie, then, by all means, go to a movie. If you want to experience a roller coaster, then Cedar Point (Sandusky, Ohio) has the best. When I mentioned at our weekly meeting that fulldome would allow such experiences, the staff all looked at me as though I'd lost my marbles. What I saw in their eyes was kids losing their lunch under that 7-meter dome.

Our mission is clear, we are very happy with it, and we will revisit the idea of full-dome in five years. I just hope the star field equals the Spitz.

And, oh, yeah: as a social worker, I got a hug from Muhammad Ali, but as a planetarian, I get hugs from kids and got to shake the hand of Neil deGrass Tyson. Is this a great job, or what?"

Now, to the question I am frequently asked: what is a planetarium doing in a presidential library?

The museum, operated by the Stark County Historical Society, started out as a science and history museum that also happened to have a library. The library, the Ramsayer Research Library, includes material from Canton's history and many of President William McKinley's papers and allied material.

McKinley was born in Niles, Ohio, the site of the National McKinley Birthplace Memorial Library and Museum. The president considered Canton is adoptive home because his career began here, and his National Memorial is located here.

Conference being held 18-20 September in Kansas City and the new SWAP website.

Amy Barraclough discussed the use of DSLR and modified GoPro hero cameras to produce dome content for the University of Texas at Arlington Planetarium. Barraclough and Gurdemir also reported on Torvald Hessel's progress toward establishing the Austin Planetarium in Austin, Texas.

Rachel Thompson, Portable Universe Manager at Perot Museum of Nature and Science, spoke about the Portable Universe planetarium program, which offers age-appropriate programs to engage students in grades PK-12 at the museum or offsite at schools. This effort involves around a dozen staff and volunteers and several portable domes to reach Dallas-area students and the general public.

Kyle Doane, Nomad Domes, 2013 recipient of the Hamilton Planetarium Scholarship Fund, spoke about his plans to bring a digital, portable planetarium to the Amateur Astronomy Society of Kenya in Nairobi, Kenya. Details about this project may be found at startsomegood.com/NomadDomeKenya.

(For more about Doane's project, see page 16.)

Paul Ballou, Mesquite ISD, Russell Planetarium, and Chris Miller, Grand Prairie ISD, Pogue Planetarium, have been busy operating their planetariums for classroom field trips and have each recently hosted well-attended, community-wide astronomy outreach events.

Sarah Littler, Noble Planetarium, Ft. Worth, reported on several new programs running under her dome and lead a short discussion about the availability of free, or low cost, dome content.

Regrettably, both Richardson and Garland ISDs have recently closed their planetariums. But, on a much happier note, in the previous four years several SWAP Local Group planetariums have undergone extensive digital upgrades, including planetariums belonging to the Mesquite, Highland Park, and Grand Prairie ISD school systems, as well as major upgrades to the UT Arlington Planetarium.

A special shout out to both Donna Pierce and John Pogue, who have had their planetariums in Highland Park and in Grand Prairie re-named in their honor. Congratulations to them both!

Please visit the new and improved SWAP website at www.swapskies.org. ☆

Reading someone else's Planetarian? Get your own by joining IPS. Go to www.ipsplanetarium.org to find out how.

2013

- 5-7 September. Imiloa Fulldome Film Festival (IFFF2013), Imiloa Astronomy Center, Hilo, Hawaii, USA. The festival will feature 25-30 full length full dome programs in 2D and stereoscopic 3D. www.imiloahawaii.org/168/ifff
- 6-8 September. Nordic Planetarium Association Biennial Conference, AHHAA Science Center, Tartu, Estonia. Conference language English. Contact: Margus Aru, margus.aru@ahhaa.ee
- 14-17 September. Giant Screen Cinema Association (GSCA), International Conference & Trade Show, Ottawa, Ontario, Canada. www.giantscreencinema.com
- 15 September. Deadline for the applicants of "A Week in Italy for an American Planetarium Operator," in collaboration with IPS Portable Planetarium Committee. www.astrofilibresciani. it/Planetari/Week_in_Italy/Week_Italy.htm
- 18-20 September. Western Alliance Conference (Pacific Planetarium Association, Southwestern Association of Planetariums, Great Plains Planetarium Association and Rocky Mountain Planetarium Association), Science City and Gottlieb Planetarium, Kansas City, Missouri, USA. Contact: jdunn1@unl.edu; www.wacdomes.org/2013/WAC2013.html
- 22-26 September. XVIII Meeting of the Association of Brazilian Planetarium (ABP), Johannes Kepler Planetarium, SABINA Science Center, Santo André, São Paulo State, Brazil. www.planetarios.org.br Contact: contato@planetarios.org.br
- 27-28 September. British Association of Planetaria (BAP), 2013 annual meeting, International Centre for Life (Newcastle-on-Tyne), United Kingdom. bapconference.org.uk; contact: Dr Jenny Shipway, president@planetaria.org.uk
- 14-18 October. Communicating Astronomy with the Public 2013 (CAP 2013), Challenges in Communication of Astronomy and Space Exploration, Warsaw, Poland. www.communicatingastronomy.org/cap2013/index.html
- 6-19 October. Great Lakes Planetarium Association Conference, Peoria Riverfront Museum, Peoria, Illinois, USA. Contact: Sheldon Schafer, sschafer@lakeview-museum.org www. glpaweb.org
 - Presentations at GLPA meeting will be streamed and videotaped. Those interested should go to the GLPA website to initiate streaming with their browsers. The GLPA website also will allow access to video clips.
- 19-22 October. Association of Science-Technology Centers (ASTC) Annual Conference, Explora, NM Museum of Natural History & Science, National Museum of Nuclear Science & History, Albuquerque, New Mexico, USA. www.astc.org
- 21-23 October. The First Russian Fulldome Festival. Yaroslavl, the Tereshkova Cultural and Education Center. Contact: en tihomirova@mail.ru; almp@post.ru; www.yarplaneta.ru
- 11 December. The Stratoscript Compendium Ring 2013, a scripting competition open to everybody by LSS-Planetarium. Contact: lionel.ruiz@live.fr; www.lss-planetariums.info/index.php?lang=en&menu=compendium&page=compendi um2013

2014

16 March, 2014. International Day of Planetaria. www. dayofplanetaria.org

- 17-19 March. 7th Science Center World Summit, Technopolis, Mechelen and Brussels, Belgium. Partners: Technopolis, Flemish science center, Mechelen, Royal Belgian Institute of Natural Sciences, Brussels. www.technopolis.be
- 31 March. Deadline for application for scholarship funds (IPS support Beijing Conference attendance by individuals). www. ips-planetarium.org
- 12-13 April. Italian Association of Planetaria (PlanIt), XXIX National Conference, Italy, and 4th Full-Dome Italian Festival. During the conference Skype session for planetarians from other countries. www.planetari.org Contact: osservatorio@serafinozani.it
- 1-5 May. Three languages-The same sky, Symposium of Planetariums 2014 Lucerne, Switzerland. Patronage: Association des Planétariums de Langue Française (APLF) ; Gesellschaft Deutschsprachiger Planetarien e.V. (GDP); Associazione dei Planetari Italiani (PlanIt). Organizer: Swiss Museum of Transport. Contact person: daniel.schlup@verkehrshaus.ch.
- 5-8 May. 13th International PCST (Public Communication of Science and Technology) Conference, "Science communication for social inclusion and political engagement," Salvador, Brazil. www.pcst-2014.org
- 21-24 May. 8th FullDome Festival at the Jena Zeiss-Planetarium, "Ahead in the curve!" Jena, Germany. Contact: info@fulldome-festival.de or Schorcht Volkmar, schorcht@zeiss.de; www.fulldome-festival.de
- 22-24 May. ECSITE Annual Conference (European Network of Science Centres and Museums), Museon, The Hague, Netherlands. www.ecsite.eu
- 21-26 June. ESOF 2014, Euroscience Open Forum, "Science building bridges", Copenhagen. esof2014.org
- 21-22 June. International Planetarium Society Council Meeting, Beijing, China.
- 23-27 June. 22nd International Planetarium Society Conference, Beijing Planetarium, China. www.ips2014.org, contact mail Dr. Zhu Jin, jinzhu@bjp.org.cn
- 18-21 October. Association of Science-Technology Centers (ASTC) Annual Conference, North Carolina Museum of Natural Sciences, Raleigh, North Carolina, USA. www.astc.org

2015

- 1 May 31 October. Expo 2015, "Feeding the planet, energy for life", World Exposition, Milan, Italy. en.expo2015.org
- 3-4 August. International Astronomical Union, XXIX General Assembly, Hawai'i Convention Center, Honolulu, Hawaii, USA. astronomy2015.org

For corrections and new information for the Calendar of Events. please send a message to Loris Ramponi at osservatorio@serafinozani.it

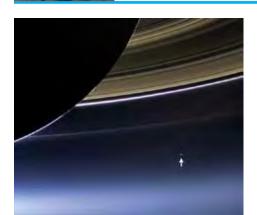
More details about several of these upcoming events is included in the International News column in this issue.

The most up-to-date information also is available online at the IPS Calendar of Events at www.ips-planetarium. org/?page=calendar



<u>Last Light</u>

April S. Whitt Fernbank Science Center 156 Heaton Park Drive NE Atlanta, Georgia 30307 USA april.whitt@fernbank.edu



Earth from Cassini. NASA/JPL-Caltech/Space Science Institute

Time for quotes from recent conferences.

I was fortunate enough to attend two regional planetarium conferences this summer. The Southeastern Planetarium Association (SEPA) met at the Museum of Science and History in Jacksonville, Florida at the end of June, and MAPS (Middle Atlantic Planetarium Society) gathered at the Earth and Space Science Laboratory, part of the public school system in Frederick, Maryland, in mid-July.

Attending a conference is like recharging batteries, I think. Catching up with old friends, meeting new ones, seeing how others in the profession create exhibits, or explain concepts, or find the funding to stay alive, is rejuvenating. Even under total sleep deprivation.

An invention sure to catch on

A crowd of planetarians in the dark can rival middle-schoolers. When MAPS co-host Jeff Grills opened a session, he told us that he was a famous inventor. Holding up a hefty hammer, he introduced the Cell-phone Smasher, and reminded us to "Do the right thing."

When a projection of Earth changed from a sphere to a disk shape, a voice called out, "Oh! It's a flat thing!" to which another replied, "So we can sell this in Kansas!"

An excellent demonstration of solar system size included Jeff Grills' "I want to show you the speed of light in real time. Ready? Want to see it again?"

At a late afternoon session, co-host Mark Bowman described their new theater: "You can just come in the dome, and turn the stars on, and meditate. Like you're doing right now."

The skinny on Armand Spitz

At a pre-MAPS conference event, Verne Spitz Rice was a featured speaker. Daughter of Armand Spitz, she regaled us with wonderful stories of her childhood.

"I was supposed to be born on the vernal equinox, " she told us, "but I rebelled." Named for author Jules Verne, one of the first images she showed was of herself at five months old, her father holding her atop a large model of the moon he'd built. "My first topless engagement."

She described their house in then-rural Pennsylvania, with not many amenities (she remembers seeing a sunset over what appeared to be a beautiful lake, but was the cesspool) of messes and guests. Her mother once told her, "There's something about a man who can make messes in the kitchen boiling Cream of Wheat to watch the bubbles break."

Armand Spitz was experimenting with the Cream of Wheat to see how to make the craters on his moon model. This was the same man who said, "If you don't know (what you want to learn), write a book about it."

Mrs. Rice recalls being terrified of thunderstorms as a child. Her father taught her, when

she saw lightning, to clap her hands together and yell, "natural phenomenon!" at the top of her voice. "It was good psychotherapy," she said.

Spitz loved musical instruments, and was always bringing home ratty ones. A zither made a fine demonstration of string length and pitch, as did the different length of pipes on an ancient pipe organ. "We didn't have music, much. We had physics lessons."

Her father lectured at the Franklin Institute in Philadelphia. At one of his lectures, a guest interrupted his talk. No one ever interrupted her father's lectures, she said.

The guest was Vijayi Lakshmi Pandit, ambassador from India. Mrs. Pandit was the first Indian woman to hold a cabinet post, and was imprisoned three times for advocating separation from British rule.

Prisoners were only rarely allowed to go outside. On one of the few outdoor visits she was allowed, she said the night sky was an inspiration.

She reiterated Armand Spitz' statement, "Under the whole universe, we are all large, we are all small, we are all equal."

Armand Spitz started one of the first science fairs in the US. A photo of the winners included one familiar face (and wild hair): Albert Einstein, who greeted the group. Legend has it that when Spitz was working on his A-1 projector, the dodecahedron, Einstein assisted with star placement. Mrs. Rice commented that "Dad thought he'd taught Albert something."

Perfect for a British accent

At the SEPA conference, there was some discussion about the narrators of full-dome programs. Why do they always have British accents? Do Americans think that makes them sound smarter?

During the MAPS conference, Robin Sip gave a "making of" presentation for his new program *Dinosaurs at Dusk*. During production, the actors speak their lines in English with a Dutch accent. Their lines are then re-recorded with British accents.

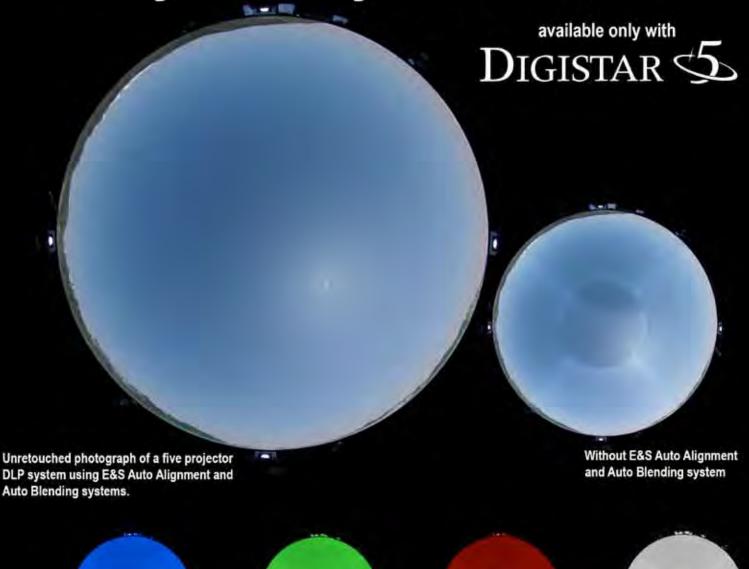
He showed us a clip from the program, in which the teenage daughter is reacting to a large dinosaur, and the voice over is "AAAAAAAAAAAaaahhhh!"

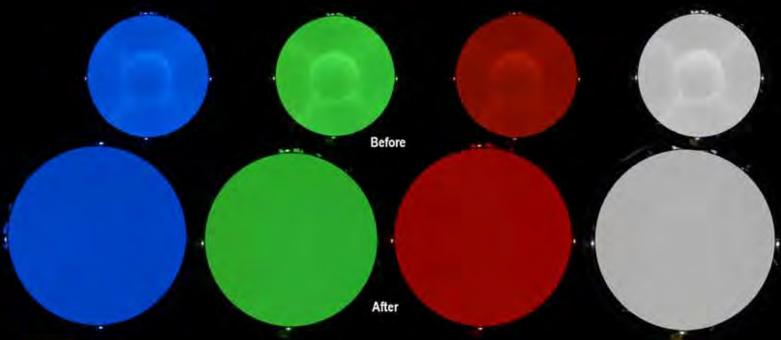
"Yeah," Robin said, "You really need a British accent for that."



Smile big for the camera: From left, Miletta Sanders, Celeste Holliman, Kris McCall, and Theo Wellington from the Adventure Science Center/Sude-kum Planetarium in Nashville, Tennessee, all wave for the Cassini spacecraft on July 19 when the craft took Earth's picture. Cassini was 898 million miles away (1.44 billion kilometers). Photo by Theo Wellington

Say Goodbye to Seams







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