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staff & contributors

EDITOR
Martin Palicki

CO-EDITOR
Judith Rubin

CONTRIBUTING EDITORS
Joe Kleiman
Mitch Rily
Kim Rily

DESIGN
mcp, llc

CONTRIBUTORS
Kathleen Cohen
Matthew Dawson
Michael Lesperance
Patrick McPike
Charlie Morrow
Dan Neafus

SALES
Martin Palicki

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This issue begins our ten-year anniversary of InPark Magazine.

We have begun the celebration by updating our look. We launched a new website at the end of 2013 and our print publication now reflects that refreshed style.

We are also expanding our reach. This issue was crafted as part of a partnership with IMERSA for their annual Summit last month in Denver. Through our agreement, we published a special Summit program that included select articles from this issue, specially tailored to their audience.

I was especially excited about this partnership as it signaled the great opportunities available as the themed entertainment and attractions worlds learn more about immersive cinema and the giant screen markets. Special thanks to Dan Neafus and Judith Rubin for helping to make it happen.

We also recently completed publishing the TEA Summit Program and Thea Awards Gala Program. These two publications are fantastic resources for our industry and are available through teaconnect.org.

Finally, I'd like to remind everyone that there is still just a little bit more time to take advantage of our "Big Three" trade show ad package. You can secure your spot in our three largest issues that travel to IAAPA's Attractions Expo (Orlando), Asian Attractions Expo (Beijing) and Euro Attractions Show (Amsterdam).

Thank you for your continued interest in and support of InPark Magazine. Withouth you readers, we wouldn't be here today!

-Martin Palicki

cover

Behind the screen at Fly Over Canada. Photo courtesy Charles Seaborn/Syncra Construction Corp

Editor's Photo credit: *David Lauersdorf*

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Project Profile: Future Energy Chicago

Museum of Science and Industry delivers powerhouse with new interactive gaming exhibit

by Martin J Palicki; photos courtesy J.B. Spector, MSI Chicago

The Museum of Science and Industry (MSI) set out to create a dynamic exhibit targeted to middle school students that introduced them to the current energy landscape and inspire them to think about how they can help create a new energy future. MSI was clear from the beginning that experiential learning was necessary to break the typical mold of science exhibits. The Museum also wanted the exhibit to have a firm foothold in reality. Utilizing real world data (and being able to adjust to that changing data) was important. That meant creating a sophisticated computer and A/V system for the exhibit's backbone. The Museum turned to Evidence Design, Potion Design and Electrosonic to help develop the overall experience, create the gaming modules and provide the technology to power it all.

Exhibit-goers begin by rediscovering the nature of energy in the dynamic Energy Garden area, where they can transform energy from one form to another via a series of electro-mechanical devices and immerse themselves in a short film that dramatically presents the story of energy in our world. Guests then convert their knowledge into action via a multi-player simulation game in which they design an energy-saving car, house, neighborhood, transportation system and city power grid.

First stop is the Energy Garden where visitors get to play with various electro-mechanical devices to create "energy" —for example, riding a stationary bike will turn on a light.

After several minutes, the lights around each of the activities dims and attention is drawn to a 20-foot wide curved oval screen at one end of the Energy Garden. A six-minute Future Energy Film provides context for the entire exhibit. The story opens with a sweeping journey across the increasingly complex ways we have extracted energy from Earth's environment, building to a sense of today's urgent challenges and the promise of "future energy" now rising on the horizon.

"The film shows that the Energy Garden and interactive games aren't disembodied experiences," says film producer Donna Lawrence. "It places the activities the visitor has just completed and will embark on in the context of the full exhibit and the entire energy story."

While appearing naturally within the room, the curved screen required much more manipulation than expected. The Energy Garden contained a low ceiling space and the team wanted a cinematic experience that wasn't interrupted by people walking in front of the screen. The only space for the Barco 3-chip DLP short throw projector was mounted to the ceiling, tucked between speaker cans and lighting tracks.

Short throw lenses need to be on axis with the center of the screen. For a ten-foot tall image, the projector should be roughly at the five-foot mark. With the ceiling-mounted projector positioned well above the top of the oval, the team borrowed technology from dome theaters to adjust for the change in axis. A Seventh Sense media server provides geometric correction and warping to adjust for the curved screen as it feeds the media to the projector.

A pathway leads to the simulation area where the guests form teams and set off to play games at five different interactive stations. Samsung LCD monitors are configured to form the Future House station with sides and a roof, which offers a range of multi-touch interactives with localized audio. The Future Neighborhood game extends the residence concept with more multi-touch interactives.

Future Power illustrates the need for a smart mix of energy on a round table with three overhead Panasonic projectors, while the Future Transportation game is laid out on a polygonal table with two overhead projectors above. Future Car invites guests to design a new vehicle by video mapping images from Panasonic overhead projectors onto a trio of small three-dimensional car models. All of the overhead projectors feature gesture recognition. A 24 by 8-foot scoreboard keeps track of the teams' interactive gameplay; a pair of edge-blended Barco 3-chip DLP projectors and Tannoy speakers display the scores and announce the winners.

Dr. Patricia Ward was the Museum's Project Director for the exhibit. The exhibit was designed to be primarily an in-depth experience and secondly, an opportunity for students to play together cooperatively and competitively while learning.

"We designed this to be somewhat of a foil to Science Storms [the Museum's award-winning permanent physics exhibit from 2010]," explains Dr. Ward. "We wanted this exhibit to be unique and different."

Ultimately, says Dr. Ward, the objective is for the technology to engage people. "At MSI, we continually push ourselves to develop ever more meaningful experiences, to move away from pushing buttons and observing." • • •

Immersive Sound

Recreating fully realistic environments requires advanced sound technology

interview with Charlie Morrow, MorrowSound

What is immersive sound and why is it important?

We live in a world of three-dimensional sensations. That is how we understand our environment. 3D sound is sound that moves up and down as well as around. Present life blends the real and the virtual, the home and workplace, the built with the natural world. With sensations we now shape the real and virtual space we inhabit and share.

Close your eyes and scan the terrain. Turn your head. You can see with your ears, hearing the shape of what is above, below and around you. Walk around and you will navigate with your ears. This is echolocation like that used by bats and sea mammals. A news story from Belgium describes a blind young man who claims to hear colors.

Our sound perception immediately detects changes of sound from physical motion, especially vertical motion, or changes in quality, say loud and soft. Sound perception automatically foregrounds moving sounds, especially those from above and below a person, sounds that can warn of earthquakes, lightning and attacks.

Our minds assume that sound comes from given sources and involuntarily size up and track sound sources. The ear is one hundred percent of the time open for our protection and quicker than the eye.

Immersive 3D soundscapes are projected into physical spaces that have sonic personalities. The 3D soundscapes take over the physical space's acoustics to create stories, memories, control and often improve sound of place.

Live, rendered or streamed, what is an immersive soundscape?

360-degree experiences are built in layers: continuous immersive ambiences, fixed and moving sounds and interactive events.
3D sounds have size and scale, which are fun to manage in production. Story boarding is useful as is mixing to scale.

We create an electronic three-dimensional soundscape with the composite sound from many loudspeakers, each fed with a separate digitally controlled signal. This fully engages the attention and can be mixed with directional speakers sound for localized sound.

Immersive is an alternative to the overhead speaker sound in many airports and restaurants or the sound of stereo speakers at one end of a room. They produce a kind of drapery or sound furniture, to quote Erik Satie.

How about immersive sound for the Oculus Rift VR?

Our sound engine works with game engines to produce continuous changes of perspective and color. You can compose the behavior of virtual sound space and enjoy on headphones or speakers.

How does your company's product True3D software minimize hardware requirements?

Using off the shelf, same-model loudspeakers, the 3D illusion works with inexpensive as well as high-end devices. True3D software creates immersive three-dimensional soundscapes by delivering digitally controlled sound to a matrix of loudspeakers above and below the heads of listeners.

Because the total effect is atmospheric, ear-level speakers are avoided except where a point source is needed. Standard devices like mac mini's, MOTU & RME soundcards as well as plugin for larger systems are specified.

Content can be linear, generative and interactive, MorrowSound has programmed sound years for hospitals and work places.

How do you handle small and large sound spaces?

The True3D experience is created with 8.1 sound cube audio zones from 8 to 30 feet sides. The zones can be coupled together in larger spaces to create whole-space effects, or can be operated separately to create localized effects within each zone.

What format sound can be played or expanded to 3D?

True3D expands mono, stereo,double M/S, binaural or 5.1 sources to 8.1 or larger. Sound can be montaged in 3D or decoded from B Format microphones.

How do you handle prototyping & large scale mixes?

Whether creating immersive sound for the Oculus or zoned sound for physical spaces, we provide prototyping systems. To make sound believably move through a 300-foot tunnel, one needs to mix at scale.

Why is Immersive Sound important for an attraction owner/designer or museum professional? What does this new technology really do?

Three-dimensional immersive sound environments can scare you, thrill you - give near death experiences like being run over by a locomotive or colliding with a comet. It can sonically transport you to another place, like virtually relaxing on a warm beach while lying in a hospital.

There is also an element of fantasy. It can put you on-stage with the band or behind the controls with the formula one driver. • • •

Fly Over Canada

Rick Rothschild and the next generation of immersive attractions

interview by Joe Kleiman

FlyOver Canada, a next-generation attraction simulating the sensation of flight, opened June 29, 2013 at Vancouver's Canada Place. Rick Rothschild of FAR Out! Creative Direction served as Creative Director on the project. A former President of the Themed Entertainment Association (TEA) and Senior VP – Executive Show Director at Walt Disney Imagineering, Rothschild previously had served as Show Director on Soarin' Over California, a flagship attraction at Disney California Adventure park.

FlyOver Canada is a next-generation flying/gliding, media-based motion attraction in the style of Soarin'. What are the key elements that make this experience distinct from earlier genres of motion theater such as represented by Star Tours and Back to the Future – The Ride?

With rides like Star Tours, the idea is that you're in a vehicle. You view the world through a window while moving through an environment. In contrast, FlyOver Canada gives you the opportunity to look around the world you are flying across, without the intermediary of a vehicle. The experience is much more like that of a bird flying forward and moving around as it flies – or like being Peter Pan – which was in fact much of the inspiration for me. Guests can move their head to view the world around them much like a bird while the sensation of surrounding motion is created by our camera, attached by a gyro mount to the helicopter.

Another important distinction is the live-action capture. With FlyOver Canada as with Soarin', the action is all live action as compared to a large number of simulator experiences that are principally produced as CG fantasy based environments. FlyOver is about experiencing real places and extraordinary environments in a way not seen before. It ends up being a very personal experience.

In terms of technology and technical design, how would you compare Soarin' and FlyOver Canada?

Here are some of the similarities. Guests view a dome-based experience while suspended in nine, open-air, flying vehicles. The orientation of the guest in relation to the dome screen, the idea of having image below you, to the side, in front of you, and somewhat truncated at the top are all quite similar.

Now for the important differences. What distinguishes FlyOver first is that the production is all-digital. Soarin' was shot on film in the IMAX 15 perforation/70mm format; we filmed and projected at 48 frames per second (fps). FlyOver was captured and is presented digitally; shot and projected in 4K digital at 60 fps. With high resolution and higher frame rate, it's like watching 3D without glasses. The closest objects we captured in FlyOver are probably 15-20 feet from you, but for the most part, everything's beyond the surface of the screen, out beyond 30 feet in the actual shot, which is past the projection surface of the dome from the guest's eye. Everything you look at feels natural and real with appropriate parallax. Being able to experience this attraction with no glasses also adds to the sense of reality, given we have added effects like mist and wind.

We filmed with a Phantom 65 digital camera with a Nikon spherical lens. We are projecting with the first commercial installation of a Christie 4K 60 frame projector in the world, with a specially designed and manufactured lens from Schneider Optics. Given our principal capture was digital, it opened up the creative opportunity for us to do a number of unique transitions and effects in post production.

Finally, there's the length of the attraction. At almost a full 8 minutes, its nearly double the length of Soarin'. Because of this, we were able to shoot in more locations. Conceptually, we wanted to create something that appropriately showcased the landscape and the diversity of the breadth of Canada. Not constrained by capacity and hourly numbers that theme parks demand, the longer experience also allowed us to have sequences that are a little bit longer than the individual sequences in Soarin'.

You also recently worked on a dome with a very different purpose - the Adler Planetarium. What similarities and differences did you find between the Adler and FlyOver Canada?

The ride system suspends guests in the middle of a 60-foot diameter dome.
Photo courtesy of Vekoma

They are two very different kinds of experiences and applications of dome technology. With the Adler, the dome was a fulldome application, with the viewer orientation being from a flat floor, so the principal immersive experience is above and around the viewer. With FlyOver Canada, the dome is a truncated, vertical half-dome, with the view orientation being from a ride seat that suspends the guest directly in front of the dome, providing an immersive experience in front, below and around the viewer.

The Adler image is provided with over 20 projectors, tiled together creating the perfect system for extremely high contrast (ultra-black) playback, which is perfect for a deep-space planetarium experience. The FlyOver image is provided with a single projector, avoiding all of the tiling issues, given that it is used to project real world daylight and nighttime images of natural settings, where variation of color, even subtle, that results from tiling would be extremely disruptive to the experience.

They really are two very different experiences driven by fundamentally different creative needs. Mostly different, with the exception they both use spherical projection surface to immerse the guests.

How do domes, anamorphic screens, and 360 cinema systems affect the public's perception of a film?

First of all, I view these kind of spaces as experiences, rather than films in a traditional sense. Films traditionally can be used to tell lengthy dialogue or narrative intensive stories. The experiences I spend much of my time developing are way less dialog/narrative intensive "stories." So, with the understanding of that central difference, it is my hope that the with the use of the variety of technologies, the guest can reach a point in their experience when they lose all sense of disbelief and become fully "immersed" in the experience. Clearly, the opportunity of much higher projection and capture frame rate stands out as a most important element in helping to produce this immersive effect with dome experiences that I don't think are as necessary for much of traditional film/video storytelling. In many cases, having a dome experience without the use of 3D can provide an even more immersive experience than with it.

The ride system is seen from the back side of the dome.
Photo courtesy of Vekoma

How is FlyOver Canada owned and operated?

FlyOver is a separately ticketed, standalone attraction in Canada Place in downtown Vancouver. Soaring Attractions is the Canadian entity that created and operates it. The two principals in this company are Stephen Geddes and Andrew Strang. They're both Canadians and Vancouver residents.

Tell us about the ride technology you selected.

Brogent Technologies is the manufacturer of the ride vehicle. They have an association with Vekoma, which allows them to leverage Vekoma's substantial expertise in ride manufacturing as well as its sales and marketing resources. Brogent developed the vehicle on their own, and E-DA park in Southern Taiwan is the site of their first system installation. Brogent, which is also based in Taiwan, has a strong background in advanced flight simulator technology.

Each of our ride vehicles has a full six degrees of movement, with all the benefits of advances in engineering and technology since Soarin' was first created to help us provide a step up in flying ride experiences.

What were some of the challenges and solutions of retrofitting the building at Canada Place to house FlyOver Canada?

Any challenge one faces, whether a blank piece of paper or a preexisting facility, comes with constraints that you begin to work with. In the case of FlyOver Canada, the constraints started with the facility. This was not just a preexisting facility, but a preexisting facility on a large harbor pier several floors above pilings that also support a full convention center that sits directly below the original theater space. So there were both spatial and structural challenges to integrating our dome and ride system.

The space dictated that we could only have a dome 19m (60ft) in diameter. For comparison, each of the Soarin' domes is around 84 ft in diameter, and the capacity of Soarin' is 87 people. Due to the smaller dome, FlyOver's capacity is 61 people. There are nine vehicles (3 tiers, each with 3 vehicles) with both systems.

There are key differences between FlyOver and Soarin' in how the dome is entered and the size of the vehicles. Soarin' has single-level boarding, which is proprietary to that attraction. Everything at FlyOver is a bit smaller and our guests first take stairways to one of three levels outside the dome ride experience to board. The FlyOver ride support structure looks a lot like the old Hollywood Squares set, with each of the "squares" containing one of the ride vehicles.

The FlyOver building originally housed an IMAX theater. We removed the concrete floor and support structure of the theater, and drove several new columns below the convention center to support the ride.

The size of the building wasn't the only constraint on the size of the dome. With current digital video projection technology, we would be unable to do a Soarin' size ride without tiling multiple projectors. Practically speaking, our 60-ft dome is the maximum size for the state-of-the-art, single-projector technology we have in place to operate efficiently.

Can you give an example where the immersive technology didn't work by being detached from the story?

I'm not one to publicly criticize others' work. I will say that there are examples out there where the lack of appropriate coordination and programming of the various technologies used to create immersive experiences aren't well done, such that there is incongruity between various elements (say motion of a vehicle and motion in the media) that continually disrupts and takes you out of the "reality" of the experience you hope to enjoy. Other elements such as low resolution and dim, low-contrast image will also detract from the experience. The whole trick, if you will, with what we hopefully do in creating immersive stories and experiences is to transport the guest into the created reality we are presenting.

How has projection mapping changed the entertainment industry?

Mapping is a great tool. It allows us to place images within larger environments and context. It started out being as a novelty, with clever use of large textural surfaces becoming canvases for projected motion graphics and animation. The audiences have become somewhat accustomed now to the "basics"; they aren't as awed by what the technology can do, which creates both challenge and opportunity to use the ability and technology to create some real "magic."

How do you see immersive media changing the way stories are told in the future?

Technology in all forms provides artists the opportunity to bring their dreams to reality... the more sophisticated and accessible the technology, the more the creative spirit and mind can find opportunity to bring their dreams to reality. So to me, that isn't necessarily the core question... the question is really what dreams do I have as a designer/storyteller that will be fun, meaningful, emotionally impacting to an audience, knowing that the tools we have just keep providing us more and more opportunity to create magical solutions to telling those stories and revealing those dreams. • • •

One-on-One: Doug Roberts

WorldWide Telescope, Microsoft Research

interview by Patrick McPike, Adler Planetarium

Doug Roberts, WorldWide Telescope Architect, is a visionary science communicator and visualizer. He is speaking at IMERSA Summit 2014 on the session, "Virtual Realities and Game Changers."

WorldWide Telescope (WWT) is a free software program that functions as a virtual telescope and is marketed as an enriching resource for schools, museums, planetariums, and homes. Its 5.0 release was unveiled in January at the 223rd meeting of the American Astronomical Society in Washington, D.C.

Here, Roberts is interviewed by Patrick McPike, Visualization Engineer for the Space Visualization Studio at the Adler Planetarium, where Roberts has held a variety of positions beginning as Astronomer in 2000 and culminating as Associate VP for Digital Technologies/ CTO (2010-2013). Roberts is also an Adjunct Associate Professor at Northwestern University.

What do you expect to cover in your talk at the IMERSA Summit?

I'll be speaking to innovation in the planetarium industry – such as connecting people in a communal dome setting with other people using personal VR devices. I feel that people want be able to ask an expert and share their knowledge and excitement with others in this communal storytelling environment. It is important to note that these advances in immersive hardware are not astronomy-specific, although they are well-suited for telling astronomy stories. They expand our idea of what a planetarium is - to include what happens outside the dome.

WWT at the Adler Planetarium in Chicago
Photo courtesy of the Adler Planetarium

We are now at a place where creating new planetarium experiences is something that can be done by an increasing number of people outside the traditional planetarium community. I can't anticipate what will be produced, I just know it will be different.

I look forward to seeing the amazing experiences that will be created when the producers can spend more time creating the experience and less time fiddling with technology.

You have been working in the planetarium field for quite some time... how did you get started?

Actually I started by consulting on a project for the visualization group at National Center for Supercomputing Applications (NCSA) at the University of Illinois at Champaign-Urbana (UIUC). I helped them to add models of the gas in the very center of our Galaxy - gas that is swirling around the 4 million solar mass black hole. The Galactic Center data was added to a detailed, 3D model of the entire Milky Way.

This introduced me to the challenges of off-line and real-time rendering, which were just starting to be used in digital planetaria. When the Adler Planetarium in Chicago and Northwestern University started a joint position, I jumped at the opportunity to use my background in scientific visualization for outreach as well as interpretation and research.

My programming skills were used to do some interesting interactive aspects of a show on black holes, in one of the first fully digital, real-time dome systems. The show used keypads on each seat to poll the audience to interact with various strong gravity environments.

After those early digital dome shows, my colleague Dr. Mark SubbaRao and I started the Space Visualization Laboratory (SVL) at the Adler, which provided an interactive visualization and storytelling space on the exhibit floor. I became more interested in merging scientific visualization for narrative storytelling with interactive real-time data exploration in domes.

Tell us more about how digital technologies have helped you communicate as an astronomer and science educator in the dome.

Going digital really opens up dome environments to the stories of the latest, most-exciting human discoveries.

I have had experiences with professional astrophysicists where interacting with a visualization helped a group

to understand complex environments. I've also had many more such experiences personally interacting with the public. In both cases technology that enabled the viewer - scientist or citizen - to change their view greatly increased how quickly they absorbed the details of an astrophysical system.

I've always wanted to embrace or create new technologies to help data exploration and communication. I think my willingness to try new hardware and software systems is one of my key strengths. I've always seen those systems as tools to facilitate something specific I wanted to do: for example, look at very large images, or view many wavelengths observations simultaneously.

You oversaw the installation of the first fully 8K dome in the US. What were the major challenges?

To this day, it is my understanding that the Grainger Sky Theater at the Adler Planetarium is the highest resolution dome in the world. Other 8K domes actually had less than 8192 (8K) pixels on an arc drawn from one side, through the zenith to the other side. The Grainger actually had more than 8K in that arc. Additionally, the projectors could display satisfyingly pure black levels for night sky visualizations.

The major challenge was to create a new, fantastic show without access to the theater, since it was being built along with the show. Everything was new - the dome material, the dome geometry, individual projectors specifications (color, black-level etc) and overall system specifications, like resolution, number of pixels etc.

When we rendered to video we were visualizing many large datasets and the render time was extreme. We didn't have time to make 3 versions and decide which looked better. We could only look at a few test images and very few video sequences. Controlling motion and using color were incredibly difficult without seeing real video on the dome. It was a challenge to move the large data around, connect with partners and get the show loaded into the theater for opening day. It all came off great, though and it was an honor to work on this project with some amazingly talented people.

What were some things you learned that might be of use to others considering 8K?

Things we did right were fast internal networking, large fast render farm and fast, capable, redundant video servers for video playback and real-time systems. We have a great dome geometry, design and materials. The projectors with very dark black levels allow software to manage blending images without physical hardware masks to prevent part of one projector's output being seen on another. Everyone who first saw the still image of the Earth there had an "ah-ha moment" and said it was the coolest thing they had ever seen.

The 8K resolution and dark black levels required specialized projectors and many of them, twenty in fact. This made the planetarium system very complex. From a hardware perspective, a big challenge is keeping the image on the dome to be uniform in brightness, especially in a live system which couldn't go down for lengthy replacements or calibrations.

What is WorldWide Telescope about?

WorldWide Telescope (WWT) is a portal to information, and an exciting new tool from Microsoft that I'm really pleased to be working on. It was developed by Microsoft Research to empower the user to explore the rich library of astronomical data using the metaphor of a virtual telescope. One of the design principles is that the tool should allow both the exploration and communication of astronomy content. This enables both narrative storytelling and free exploration.

Functionally, WWT is similar to other planetarium systems. Its real power is that it can be run on a smartphone all the way to a multi-million dollar 8K projection system. The reality of modern astrophysics is that I give instructions to the observatory remotely to observe things and then expect my data to be accessible to me on a variety of devices from phone to supercomputer. WWT deals with data and provides scaled access to it in exactly the same way.

This should make cool capabilities much more available... WWT was first released in 2008 and in since then it has many new features that enable fine control of tours for cinematic experiences. Also, WWT is now set up to play back in digital domes, from completely driving small DIY domes to running alongside vendor-supplied software in some of the world's largest domes.

What is the future of planetariums, in your opinion?

In my experience, the two most impactful aspects of planetaria are 1) seeing the natural beauty of the cosmos in an immersive environment and 2) the communal aspect of a shared experience, guided by a good storyteller. Planetaria are places where that guided exploration happens. There will be an evolution of technology that brings increasing visual fidelity at each iteration.

Integrating personal VR between people distributed geographically as well as to large dome installations using avatars, portals and other elements of virtual reality can bring planetaria into a totally new place, connecting people to each other and to content experts. There's great potential that this will open up to many new users making and sharing content, and new, unexpected ways of communicating to one another just how amazing our universe really is. • • •

Patrick McPike is Visualization Engineer for the Space Visualization Studio at the Adler Planetarium, Technical Director for show production at the Adler Planetarium, and Director of Immersive Creations LLC. He has been leading the technical aspects of show production at the Adler Planetarium in Chicago for over 8 years.
www.immersivecreations.com

Big Data

How can information & personalization help your institution?

interview with Kathleen Cohen

Ever since Edward Snowden exposed the NSA's efforts toward data collection, big data has become an idea that makes people nervous. Big data and personalization is often thought of as a corporate reach into the privacy of the consumer.

Kathleen Cohen, Digital Advisor and former VP of Digital Innovation and Integration for the National Constitution Center, spoke about the ethics of big data and personalization at the International Association of Amusement Parks and Attractions (IAAPA) panel "Future Legends of the Industry" at The Attractions Expo in Orlando last November. What became apparent to InPark Magazine was that the industry is lagging on this discussion. When Cohen asked who was talking about big data at their company, only two people raised their hands- Brian Edwards and Roberta Perry of ETI. We wanted to find out more.

Cohen is the lead consultant and founder of The Collaboratorium, Inc., a strategic, digital media consulting firm focusing on emerging technologies and the urban streetscape. Cohen also leads initiatives for persons with disabilities, focusing on accessibility & innovation, and user-experience. Cohen is particularly interested in how organizations lift the ceiling on human potential through innovative visitor experiences.

Previously, she worked at Walt Disney Parks and Resorts Online, IBM Centers for Innovation and DreamWorks Interactive. You can find out more about Kathleen at www.thecollaboratorium.com.

History Colorado Museum is using IBM big data analytics to increase visitor traffic and deliver an exceptional museum experience. ***Photo courtesy of Attraction Services.***

Big data: can you break it down for us?

With regard to theme parks and museums, I would boil big data down to this: it's the by-product of the data we are collecting and analyzing in order to predict what our visitor wants and then, to give them options to act upon, based on the predictions. This is another way of saying that big data will give our visitors a valued, personalized experience and enhanced engagement that ideally would end in a feedback loop where we can even better know our visitor and tailor experiences for that person.

Big Data can be broken down into four steps:

1) Collection of Data: some you already have [CRM, POS, eCommerce, Social Media], others you have to purchase.

2) Descriptive Analytics: where you extract and condense the data from your visitor's multiple access points into more useful sets of information (e.g., demographics, purchase history) so that you can describe what has happened, anywhere from "liking" in social media to a ticket purchase from five years ago.

3) Predictive Analytics: you take the data sets and crunch them even further through modeling, statistical and data-mining techniques to make a prediction of what might happen.

4) Prescriptive Analytics: where more than one prediction is made so that there are options/advice to offer, depending on the outcome so that the best course of action can be taken in alignment with your business goals. Essentially, you are curating a story about your visitor to align with your business goals.

What does personalization have to do with big data?

After working together with Brian Edwards from ETI on several personalized visitor experiences, it became clear through his thought leadership that if you are interested in what your institution will look like in the next five to ten years, personalization is essential. Without it on your business road map, your company could be at risk.

Now that most every visitor carries a mobile device, there are expectations that:

1) they can curate their own experience on their own device if a platform is not provided by the institution and

2) the environment will recognize them.

Given that mobile technology can find people or draw traffic to a brand (Presence Management), if the visitor opts in, the visitor will get a more enhanced, personalized experience available on the device. Theme parks and museums have an opportunity to deliver personalized content / experiences to the visitor. In order to do this, the theme park / museum needs to capture visitor information. Initially, the platform could be the personal mobile device, but eventually and ideally, it will be a wearable (e.g., Disney's My Magic+ wristband) to get you away from being "heads down" in your personal device.

Can you provide an example of who is using big data for theme parks and museums in a successful way?

The biggest user by far is Disney and their MyMagic+ program. This program personalizes the guest experience at the theme parks and hotels in Orlando.

When I worked at Disney in 2000, they were already big data project planning, with the idea that it would be a twenty-year initiative. They had the foresight to invest in their guest because of their vision and leadership in customer relationship management.

But let's first define success: I would say that since this is all so new and about moving the wheel, it's more about the backend structure than the visitor experience for most companies at this point. Every ride, exhibit, interactive installation and show in development should consider having some big data built into its infrastructure.

The idea is to get everyone at the company to understand what your aims are and that there is a mantra of "doing no harm" to the customer. Are you committed to a deeper understanding and trusted relationship with your visitor?

From my experience, aiming the backend implementation of big data toward middle management usage means that everyone in your company can understand the overall mission of a big data strategy.

How do we even begin to collect, analyze and use big data?

Step 1) Determine, as an institution, if you use big data or if you're going to be using it. (Of course, you should. Without it, your business will not be able to compete.)

Step 2) If yes, have you identified who in your organization is equipped to handle this? Many organizations think it's the IT department, but this is not the way to go. It's a joint conversation between digital (user experience designers, engineers) / marketing / visitor experience / executive. If you don't have an in-house process for this, then there needs to be a big data strategy conversation.

Step 3) Hire a technology partner. This person / business will guide you through a big data process.

Step 4) Consider an ethical assessment, which takes into account two main principles of big data and personalization:

A) How do you have an enhanced personalized experience and "do no harm" to your visitor?

B) What are you prepared to give your visitor in exchange for his/her data?

"Doing no harm" means protecting your visitors' data. This is a trust that your visitor has given you. By communicating your intentions, both internally and externally, with regard to big data and how you intend to use it, you can develop a competitive edge for your institution.

Step 5) If you agree in practice to steps 1-4, consider designing a small exhibit / interactive installation where you can get your feet wet with regard to big data.

So, if we initiate big data projects, what will be the benefit?

Big data is not going away and you will need to harness it in order to compete. Not only will you better understand your own needs and how to develop strategies within your own company, you will have a better understanding of new and existing visitors.

For example, when you talk about family entertainment, you're talking about three generations – there's a belief that the millennial generation would expect personalization and lead the family experience in the next five to ten years. You could build in repeatability, retention and loyalty as well as a feedback loop of when you need to update or change content.

For museums, which are dependent on grants and donations, being able to provide statistical information from big data is key. It reveals impact, ROI and helps to demonstrate being on mission. In addition, the way that museums have been traditionally built and curated is quickly becoming out-of-date and no longer dynamic for the visitor. The content has to be presented in a more appropriate way with regard to the digital world that we live in and the smart environments we engage in. This is vital for survival. If you are interested in more global information about where museums should be focusing their efforts, Arup F+R+I published, "Museums in The Digital Age" http://tinyurl.com/k23pmr9

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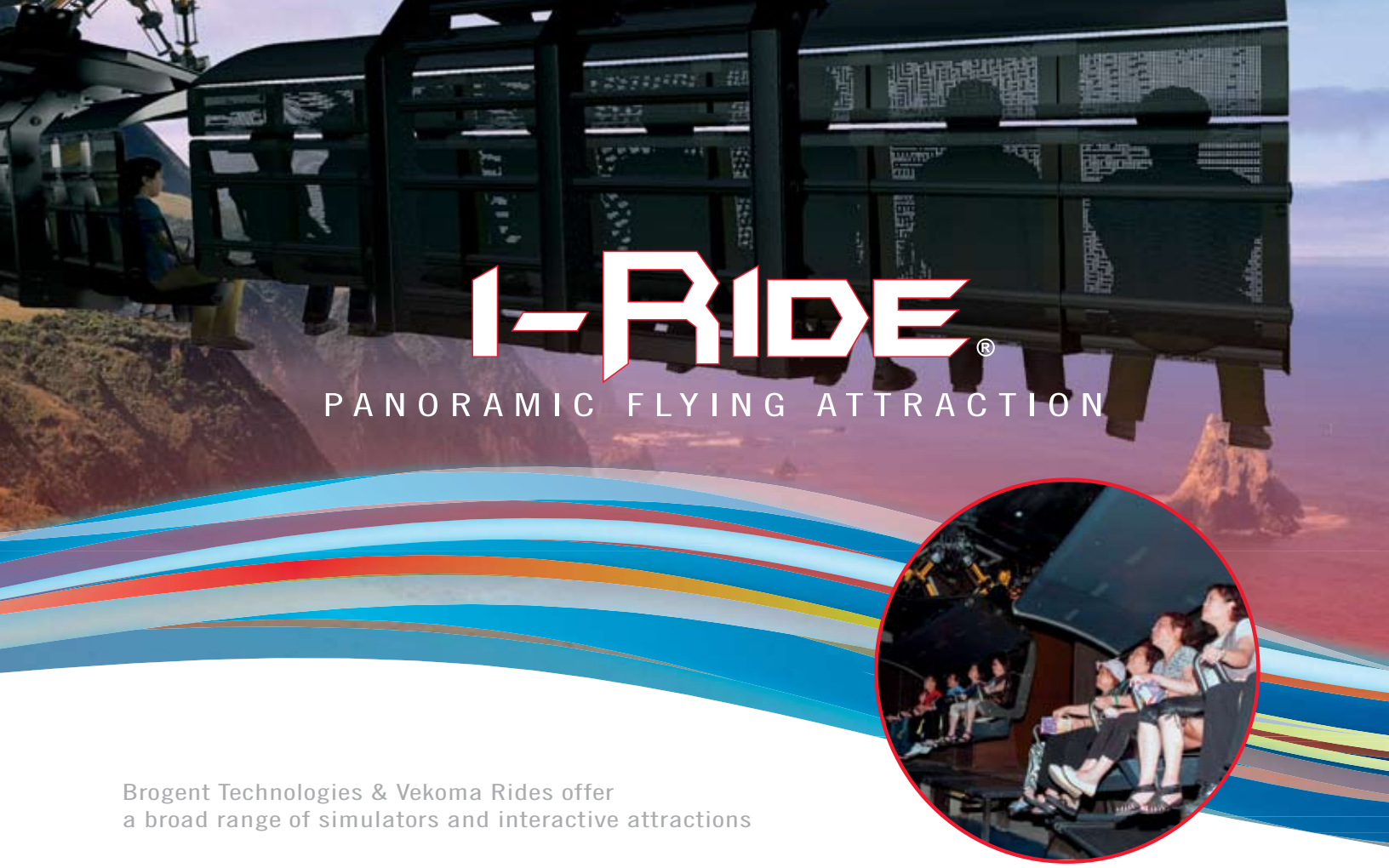

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Rearranging the Closet

Decoding the LGBT exhibit space

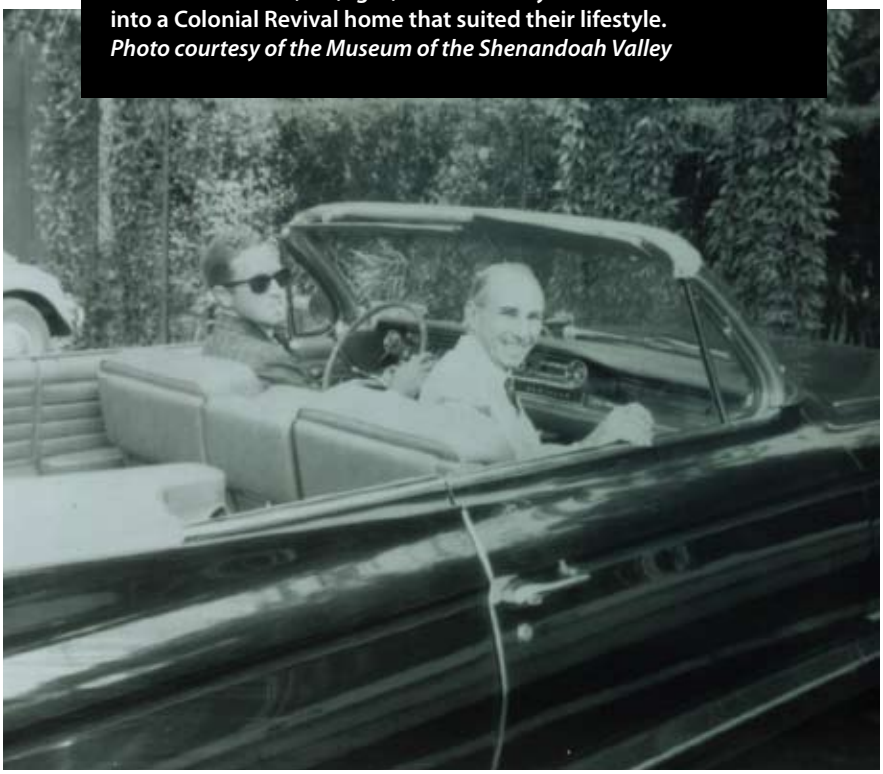
by Michael Lesperance

What makes people care about historic houses? Some are important because of the people who lived there, such as Hyde Park. Others, likethe McLean House at Appomattox Courthouse, because of events that unfolded inside. And some structures, like Falling Water, represent magnificent architectural styles and/or innovations. Revered places like Monticello or Mount Vernon even combine some of these characteristics.

Glen Burnie, built on the ancestral home site of the Wood family that founded Winchester, Virginia, doesn't quite exemplify any of these traits. Historical analysis revealed that, contrary to long-held legend, only a quarter of the structure remains from an 18th-century precursor. James Wood, notable as the man who founded Winchester, Virginia, never lived in the current house (his son, Robert, built parts of the extant structure in 1793 and 1794). The 1960s Colonial Revival dwelling is not especially architecturally groundbreaking.

And so, when the team of interpreters and historians working on a new master plan for the Museum of the Shenandoah Valley, built on the grounds of the house, began planning a new visitor experience to accompany a grand reopening of the house after a two-year-long rehabilitation, we asked ourselves what really stood out about this place? What continues to make Glen Burnie special?

Julian Wood Glass, Jr. (right) and R. Lee Taylor remade Glen Burnie into a Colonial Revival home that suited their lifestyle.
Photo courtesy of the Museum of the Shenandoah Valley



Museum Director Dana Hand Evans, hired to spearhead a major re-imagination of the overall visitor experience across the campus, wanted something different from a traditional historic house tour. Moreover, the rehabilitation to create a sustainable house museum could not include the expensive systems needed to ensure a museum-quality environment. The most significant paintings and furnishings would now be displayed in the adjacent museum. With the "best" furnishings removed and questions looming about the house's historic pedigree, the team again asked that touchstone interpretive question: "What will make visitors who do not have a prior connection to Glen Burnie care about this house?"

Answering that question led the museum to consider an entirely new direction for interpreting Glen Burnie. To understand the significance of the decision requires a bit of background on the history of the Museum of the Shenandoah Valley (MSV). When the last owner of Glen Burnie, Julian Wood Glass, Jr., passed away, he left his estate and significant assets to a trust charged with building a museum on the property. He also left behind a legacy as a collector of fine arts, philanthropist, and prominent member of Winchester and New York society. Since the Michael Graves-designed museum (2005) and the Glen Burnie home and gardens opened to the public (1998), both venues have focused on this part of Glass' life.

The fact that Julian was homosexual, and that he rebuilt Glen Burnie as a residence for himself and his lover R. Lee Taylor has, until recently, been omitted from interpretation at the site. Taylor had variously been described as a secretary, friend, and caretaker. As part of a broader master planning effort for the MSV campus, it became clear that no sensible story of Glen Burnie and its historic gardens could be told without the full context of the Glass-Taylor partnership. As scholar Josh Adair has noted:

> Curators and docents alike might intimate some difference about a "bachelor" who helped collect the items in a museum [or historic house], but such references seem to be delivered as a kind of aside, the verbal equivalent of a "wink, wink, nudge, nudge" that is meant to signal either disapproval or a sophisticated acceptance sotto voce.[1]

MSV leadership agreed that the truth needed to be told to provide the most factual and comprehensive interpretation of the house. Specifically, the goal is to tell the story of how Julian and Lee used the spaces, and what they intended as they developed the home and gardens. The spotlight will move off of historic furnishings and onto the couple and their guests.

This decision required vision and courage on the part of the museum. Although some of the original trustees

had passed on, many long-time supporters, including friends of the couple, continue to play an active role in the institution. How would the community as a whole react to the idea of telling the story of a gay couple inside this iconic and beloved resource? The museum set about finding out by organizing a series of public meetings and "listening sessions."

These sessions revealed much about changing perceptions not only of homosexuality, but also, perhaps, in the way that people view issues of privacy. In sum, the community generally wanted to learn more about the people who lived in the house and how they used the rooms to entertain, socialize, and just plain live their lives. Perhaps the community's reaction should not come as a surprise, given how rapidly acceptance of homosexuality continues to steamroll legal and social conventions.

Mainstreaming of gay relationships explains one of the major social shifts that will allow historic houses and museums like Glen Burnie to depict the homosexuality of their residents, founders, and benefactors more openly. As recently as a decade ago, the vast majority of visitors to these institutions might have had difficulty looking beyond the taboo aspect of sexual contact. By removing the "exotic" or "shameful" label from same-sex relationships, we have reached a point where visitors are open to understanding the cultural attributes that shaped the collecting, entertaining, and—as at Glen Burnie—architectural decisions that reflected homosexual lives.

Adair made this point in his 2010 article, "House Museum or Walk-In Closet? The (Non)Representation of Gay Men in the House Museums They Called Home." When interpretation moves away from the sexual aspect:

> the focus can become an examination of gender atypicality in light of evidence from the owner's life and his collection. In this way, house museums can begin to foster discussions of gender, its construction, implications, and enforcement in society, while destabilizing visitors' preconceived notions about what it means to be male in Western societies. This shift in focus from prurient sexual details to gender roles can help museum audiences move towards more inclusive and accepting views of others.[2]

Encouraged by the community's response, planning has continued to focus on how Julian and Lee lived in the house. Specifically, what ways did they entertain? How did members of the community relate to their sexuality? How did being gay influence the choices they made about everything from decorating to themes for parties? A current exhibition at the museum, "Moveable Feasts: Entertaining at Glen Burnie," formally discussed the Glass-Taylor relationship, to significant acclaim.

It is no coincidence that as word of the new interpretive framework spread, new content has come to light. In part this reflects the passing of an older generation, as heirs uncover boxes of photographs and documents. But it also illuminates the changing attitudes about homosexuality across broad swath of society. Several of the late couple's friends have given interviews discussing life in Glen Burnie from the 1960s until the 1990s. Others have shared letters and slides (among the nuggets are letters signed with the code 1-2-3, which stood for "I love you").

Significant questions remain as to how institutions will choose to interpret the homosexuality of significant figures. It is not unfair to ask what Julian Glass and R. Lee Taylor would have thought about their private lives being on exhibit. The MSV, to its credit, has chosen to let the facts define the story. The story, in turn, will reshape the interpretation of the house. With the focus off of the furnishings and now squarely on how people used the house, there will be more opportunities for interpretive connections, and visitors are going to care.

• • •

Michael Lesperance is a principal of the interpretive planning and design firm The Design Minds, Inc., located in Fairfax, Virginia. He also teaches museum studies at Georgetown University and is a member of the steering committee of the American Alliance of Museum's LGBTQ Alliance.

[1] Joshua G. Adair, "House Museums or Walk-In Closets? The (Non)representation of Gay Men in the Museums they Called Home" in Levin, 274.

[2] Adair, p. 274.

The Language of Fulldome

by Dan Neafus, IMERSA co-founder; Manager, Gates Planetarium

Dan Neafus and his "Language of Fulldome" live presentation/demo have been in demand for several years at conferences and film festivals. Neafus points out that the unique, immersive properties of the medium and their effect on the viewer call for a unique approach to storytelling that departs in many instances from traditional filmmaking techniques. The presentations have grown into a full-fledged written treatise on the subject, of which this is an excerpt. Dan cites as one of his foremost inspirations in developing these concepts filmmaker Prof. Ben Shedd of the School of Art, Design and Media at Nanyang Technological University in Singapore, particularly Shedd's "Exploding the Frame" research.

Modern storytellers and technicians are inventing a new language for immersive cinema which may be expressed in many ways. This evolving experiential language is a synthesis of jargon and techniques from many disciplines, each contributing its own idiosyncrasies to our conversations.

Within immersive cinema we must recognize that as you move the camera, you are moving the audience, physically and emotionally. The camera is the viewer and our virtual camera represents not just the audience perspective, it is the viewer's reality.

Language of the sphere
An immersive screen may be thought of as a bubble ship, enclosing an audience. When describing the attributes of a shot we are actually describing what is happening to the audience while traveling within this bubble, consider that the audience is the camera.

Shooting
Linguistic challenges persist as we begin to define techniques for choreographing immersive cinema. The term shooting is ambiguous because we are no longer aiming and shooting at things. The recording or rendering may be initiated by simply clicking a mouse button. Our cameras are often virtual, or it may be some extremely wide angle, omnicamera designed to acquire every sight and sound in a spherical scene, again the recording may be triggered remotely with a finger touch.

We can redefine our language of shots by modifying some conventional shooting descriptions. Currently accepted camera lingo uses the perimeter of the rectangular frame as a reference and describes the apparent movement of subjects within the viewfinder frame. Scenes are composed in relation to this frame, by moving the camera: vertically, horizontally, far, close, or by having the subject(s) themselves move, or by manipulating the optical mechanical lens focus and magnification.

To define a fulldome sequence, a director needs to describe audience motion, while disregarding the viewfinder frame. They must use techniques to illustrate exactly what the audience sees around them, and how they are moving in relation to the subjects. These audience motions are similar to conventional camera moves rather than lens movement, and require a more appropriate, audience-centric terminology to describe them.

Zooms
When an audience moves away from a subject more of the surroundings are revealed around it creating a wider field of view. This is not done by optical means, as is typical in zoom lens shot. It is done exclusively by moving the audience viewpoint from one location to another. Thus a wide shot is a viewpoint from very far away from the subject, taking in most of the scenery around the subject. A long shot or establishing shot is a vantage point that is far from the subject. A medium shot is closer to the subject and a close up is an audience view near the subject. A tight shot is acquired when the audience feels very close to the subject.

Experiential precedent
Many sequences from immersive cinema need to be experienced to be understood. Real time data navigation software has simplified the choreography of complex scenes by allowing a piloting director to use a flight control device to rehearse a flight path sequence through a model and then save out representative frames as a storyboard, illustrating important moments within the sequence.

Using this real time technique, a director can actually rehearse each sequence in person. When rendered these unique experiences become part of a catalogue of experiential precedents that all film makers can reference. Audiences will be able to experience these moving scenes in person and become familiarized with these new techniques, adding to their visual and experiential literacy.

The majority of shooting conventions are useless when creating complex immersive scenes where an audience moves among other moving objects. These audience motions help to tell the story and often create interaction with the scene's content. For example our audience feels like they are shrinking as they pass through the eye of a needle during the fulldome film NANOCAM by Roberto Girón.

In the film ALL WE ARE by Carter Emmart, illustrating an adaptation of the Ray and Charles Eames movie POWERS OF TEN, the audience slowly spirals down toward objects on a tabletop. They feel like they are shrinking, as objects appear larger and larger in the foreground. Large objects loom in the background while emphasizing ever smaller objects appearing one by one in the foreground.

Experiential Language
Immersive cinema is experiential cinema, engaging the audience in a shared voyage.

Discovering places otherwise impossible to visit, the audience transcends physical limitations of time & distance, shrinking down to witness tiny details of atoms, or perhaps travelling back in time to explore our primordial origins. Immersive cinema is a shared experiential voyage within a common sphere of perception.

Science visualization artist Robert Patterson endeavors to disseminate his team's earth and space science by flying audiences through the data assembled by his team. This type of reality based immersion helps scientists to create accurate virtual models directly from their own data. Once visualized, a researcher can navigate and share their model of reality with colleagues or the public.

Scientific visualization is utilized in many disciplines of research, from archeology to astrophysics. Virtual voyages take on special meaning when exploring scientific data sets acquired through cameras, telescopes, microscopes or satellites. Features that are collected digitally may remain unseen in their raw digital format, until they are rendered into reality through scientific visualization and virtual immersion. When the dynamics of time and motion are added into the equation, participants can truly experience being within a phenomenon.

Language of the edit
Today's editing language is quite sophisticated and its comprehension is common among the modern movie audience. These conventional edits work well for small screens but may be quite disorienting when used in the immersive environment. Some fulldome directors choose instead to choreograph an uninterrupted camera path, arguing that the best edit is no observable transition at all.

Continuous scenes
To avoid confusing an audience and help them to follow the movement of the story, some directors try to design uninterrupted sequences into long continuous shots throughout the story. This immersive editing technique guides an audience effortlessly throughout a film. Any unavoidable transitions between scenes are carefully planned for the giant screen, resulting in a seamless voyage throughout the entire story.

Orbiting
Another traditional film editing technique sequences reverse angle shots by quickly cutting between several points of view. A preferred approach for immersive cinema takes a completely different approach by slowly orbiting the camera around the subject, providing the audience with views from different sides of the action. This is much less confusing to the viewer than multiple hard cuts from opposing sides.

The fulldome film WE ARE ASTRONOMERS by Max Crow effectively uses this orbiting technique and a corresponding subsonic sound effect, to reveal complex phenomenon as the audience orbits two impacting particles in the Large Hadron Collider. This orbiting technique preserves context throughout the scene and avoids confusing the audience.

Depth of field and racking focus techniques work well for moving pictures and have been adapted for immersive cinema to emphasize a subject through manipulation of focus and detail. Reveal shots also work well in immersive cinema. Reveals may have the subject appear out of darkness or appear larger and larger as they approach from obscurity. It is also quite effective to reveal subjects by having them move into view from the bottom edge of the screen. Peter Popp's film REALM OF LIGHT using dark, rocky asteroids to frame the next scene and then drift out of view to fully expose a giant red star looming in the background.

As a common language for immersive cinema is translated and adopted, we should become more proficient in communications with our peers and will give our audiences more meaningful immersive experiences.

Fulldome theaters are not only hemispheres of experience, they are spheres of influence. Audiences and producers are becoming more and more informed, learning what can be done, and what to expect from an immersive film. Yet immersive cinema remains a naïve format offering unprecedented access and creative opportunities to producers.

Muriel Rukeyser's observation that "the universe is made of stories not stars," reminds us of the timeless importance of our stories, inspiring us to become more fluent in our language of immersive storytelling and to connect with our audiences by speaking to their hearts. Immersive cinema offers unprecedented access and creative opportunities to producers. • • •

Jeri in the Sky with Diamonds

Jeri Panek's lifetime of achievement

by Judith Rubin

"Queen of Digistar"Jeri Panek was singled out for lifetime honors at IMERSA Summit 2014 in Denver, March 6-9. She is well known in the planetarium community in her role as director of sales at Evans & Sutherland, which company she joined in 1980. She earned her nicknames – "Mother Digistar," "Queen of Digistar," "DigiMom" - in the course of a stellar career (pun intended).

Jeri's estimable sales record must be credited for introducing and popularizing the digital planetarium, and putting in place a vast part of today's fulldome theater network. But what about the development of computer graphics technology and the personal computer culture? Jeri Panek was on the scene for those, too.

After attending the University of Utah in the 1960s and studying public relations and computer science, Jeri Panek was hired at Univac (now Unisys) in a PR position. Then the University of Utah Computer Science Dept. came calling. "At the time, this was one of the premier places in the world for computer graphics research," she recalls. "Robert Taylor called me in for an interview, as one of very few people then familiar with both computers and PR." (Taylor was a leader in the early research and development of the personal computer and the Internet, and then the head of ARPA research at the University of Utah – ARPA was a government agency connected to the US Department of Defense.) Although, says Panek, she "wasn't looking for a new job," Taylor said, "'Pretend you're twins. You meet again in five years. Which one will be further ahead and will it matter?'"

"Retro" Jeri on a conference tour.
All photos courtesy of Evans & Sutherland

Panek thought it over. "As long as I'm working, it matters," she decided, and accepted the new position as Director of Communications in the Computer Science Department. Her responsibilities included acting as liaison between the department and ARPA, which was sponsoring advanced computer graphics research at the university. Jeri helped students improve the writing in their theses and dissertations, which were published as technical reports, shared with the government, and distributed to other universities. Other projects that Panek recalls the department being involved with included helping develop the first artificial heart implant and artificial heart valves, and restoring historic recordings of the famous opera tenor, Caruso.

She stayed with the university for about 5 years, during which time she continued to study. She took classes in writing and management, and in computer science. She studied programming with a young Alan Kay (a personal computing pioneer known for the Dynabook concept). She made an impression on Dr. David Evans, who chaired the department, and Dr. Ivan Sutherland, who worked with grad students on 3D algorithms and graphical user interfaces. "The very first 3D doctorate was on a 3D modeling program called Sketchpad. Ivan's work at M.I.T. Sketchpad was the first human/computer interface that used a light pen to interact with graphics on a computer screen. Because of this breakthrough, Ivan came to be known as the father of computer graphics."

She interacted with research students who became industry leaders, including Kay, Edwin Catmull (co-founder of Pixar), Jim Clark (founder of Silicon Graphics) Alan Ashton (co-founder of WordPerfect) and Nolan Bushnell (co-founder of Atari). "I started to see a career picture for myself." She served on a national committee for SIGGRAPH, which was where she met Gordon Smith, then VP of Singer Business Machines.

In the early 1970s, she returned to Univac for a few years. Opportunity came calling once again, in the form of the PR department at Singer. "The call came from New York. 'Did I want to work in Europe?' Gordon Smith was the connection." She became director of software distribution, living in Brussels for two and a half years with her son. When the company was sold and headquartered in the UK, Jeri elected to return to the US and took a job with Beehive International, where she remained 4 years.

Then she got the call from Evans & Sutherland that would settle her career. It was 1980; Drs. Evans & Sutherland had founded the company in 1968. They had a new product for planetariums and thought she'd be good at selling it. The company was still serving the military, but "it wasn't their first non-military product. They had done training simulations for civil aviation, for ships, CAD products and apps for newspaper printing."

The new digital planetarium was the brainchild of Steve McAllister and Brent Watson. “They were both astronomy enthusiasts. They reasoned that if you could simulate objects on Earth, why not objects in the sky?” They created a starter prototype on their own time. “‘Make it better and I’ll finance a real prototype,’” said Dr. Evans, according to Panek, which led to “‘Get one order and we’ll make it into a product.’ That’s when John Chatterly from the sales department hired me.”

Panek found someone willing to take a chance on being the first proud owner of a Digistar system: the Science Museum of Virginia, in Richmond (SMV) – at the time headed by Dr. Paul Knappenberger. The deal was inked in 1980 and the flagship installation followed in 1983, by which time 4 more systems had been sold. When the Virginia system opened, “The motion was a little rough, the stars were too big and it needed to be brighter,” says Panek. “But people loved it. We later upgraded SMV at no charge, and it went on from there.” Dr. Knappenberger continued his early-adopter ways throughout his career, including purchasing the first E&S StarRider for the Adler Planetarium in the late 1990s. SMV in its turn recently selected a new Digistar 5 that will be opening in March 2014.
Digistar didn’t fully exist at the time Panek was first marketing it. “Most planetariums didn’t even have a computer,” she reminds us. She depended on slide presentations in her sales calls.

Digistar technology was used for the starfield and graphical displays for the feature film, Star Trek II: The Wrath of Khan, and Jeri Panek’s name is listed in the credits. A bit of never-before disclosed trivia about the making of the film: Paramount was adamant that no logos or identifying marks be used in the display monitors in the movie. Steve McAllister wrote the word SNAVE on one of the display screens, which is “EVANS” spelled backwards.

Improvements in the technology were starting to bring full color video simulations within reach of non-military budgets. One promising, early manifestation was Virtual Adventures, jointly developed by E&S and Iwerks Entertainment (now SimEx-Iwerks) for museums. It combined E&S real-time image generation with a multi-user motion vehicle and animated content in an underwater scenario. “Virtual Adventures was ahead of its time,” says Panek. “But computers were becoming smaller and faster and we started to port that over to the planetarium industry.”

StarRider was the first time E&S was able to offer full-color video to its planetarium customers, along with the ability to program in-house, empowering the digital planetarium to dramatically broaden its content capability beyond starfields. This is when the term “fulldome” started to be used. Now, fulldome has become the planetarium industry norm, and digital dome cinema has gained attention and some implementation from other sectors including theme parks and spas. E&S competes on an international playing field with several other providers, all of whom continue to advance and improve the medium. At the high end, the first 8K systems have appeared over the last few years, including the Digistar 5.

Panek underscores the importance of the team concept, and communications. “The members of a good team listen to each other, and solve problems together. That’s how to keep a sense of what’s available, possible and practical. That’s how you look down the road to stay ahead of the competition, and on the cutting edge of development.”

She started a newsletter for Digistar customers and helped establish the first Digistar Users Group (DUG) in the mid-80s. “At the end of the day, the best software and hardware comes from listening to our customers.” • • •

Boundless Possibilities

IPM's Joe Kleiman likes what he finds under the dome

Photo: Laserium

Two recent events in the San Francisco Bay Area highlighted non-conventional uses of the dome for entertainment.

On October 11, I visited the Fujitsu Planetarium at De Anza College in the South Bay city of Cupertino for a live performance of Spontaneous Fantasia.

Over the years, I have witnessed many performances on the dome of an artistic nature: giant-screen films such as Chronos, fulldome shows such as "The Life of Trees," live presentations from Laserium and Laser Fantasy, and "VJ" work from SAT. Even among all that variety, something stands out as unique about Spontaneous Fantasia, the brainchild of Oscar winning artist J. Walter Adamzyk ("J-Walt").

Presence and showmanship

For one thing, J-Walt was in our midst. He was not sitting at a console in the back or the front of the room. He was not staring at a monitor. He appeared in the middle of the planetarium, joining us, the audience. His monitor was the selfsame dome canvas upon which we enjoyed his ever-changing visualizations.

J-Walt stood, like a rock star, center stage with his "anitar," a guitar for animation, slung over his shoulders. On one end, a touchpad for drawing. On the other, a joystick for movement. Between the two, an interface to a mixing board. He began by drawing simple shapes as the heads of two-dimensional stick figures. Then they began to dance and rotate in 3D over an ever-changing background. At another point, giant floating sculptures resembling abstract candelabras and chandeliers floated above us, their arms growing longer and in new directions with each passing moment. And as colored rings flowed over the screen, yet more rings flew from the sky, as J-Walt threw glowing wristbands into the audience. We then all waved them above our heads, becoming one with the show and extending the imagery beyond the screen.

Improvisation and technology

In his climactic piece of the night, J-Walt transported us to a fantastical planet, creating mountains and oceans, populating it with trees and wildlife, and giant Olmec heads suspended in the night sky upon serpent's tails. That's how it appeared to me, but the visuals are so complex and abstract that they can be interpreted in many ways.

Karl von Ahern, Technical Director of the Fujitsu Planetarium, gave us a tour of the equipment and explained that the Sky-Skan definiti system J-Walt was hooked into uses two SONY SXRD 4K projectors, each with four channels. After the show, I asked J-Walt if he was using pre-rendered background with live animation. The answer was no. Everything he was animating – foreground and background – was being rendered live, putting the "spontaneous" in Spontaneous Fantasia. J-Walt performs his show in flatscreen 3D formats and in Sky-Skan digital fulldome theaters, and his schedule of upcoming shows can be found on the Spontaneous Fantasia website.

Laserium Returns!
A few weeks later, we were off to the Chabot Planetarium high in the Oakland Hills for two performances of Laserium. One show used music of The Beatles and the other, Pink Floyd-Dark Side of the Moon. The Oakland installation marks the second location for the official, next-generation revival of Laserium - the creation of Ivan Dryer - following the Saint Louis Science Center. Our laserist for the evening was Danny Neilson, a master of the art who a decade earlier had been laserist at the original Morrison Planetarium in San Francisco.

Neilson was very generous and cordial in explaining how it all works. Two lasers were used. One, an argon-ion laser, was mounted in the center of the planetarium, and most projections came from this. A second RGB laser sitting on the stage at the foot of the seating area added additional effects, including waves of laser light pulsating over the audience. Fog machines gave an ethereal effect to the beams of light from the projectiondesign projectors used in the Sky-Skan digital dome system, which were used to create a starry background on the dome and a flight through space complimenting Neilson's animations.

The Beatles show was a collection of greatest hits with many pre-rendered, cartoonish animations. It makes for a perfect family experience or introduction to Laserium.

Pink Floyd Plus
But it was with Dark Side of the Moon where the system really shone. I confess that I am a huge Pink Floyd fan. I've seen the band and its members numerous times in concert and I saw the Pink Floyd Laserium show performed in a number of venues in the 1980s. With the theater's sound system, the background flight through space, and the lasers not only hitting the screen, but flying and dancing just inches over our heads, this was not only a far cry from those earlier laser performances, but the closest I have come to experiencing a Pink Floyd concert outside of one.

The great irony of such a statement is that I saw the band perform live at the Oakland Coliseum, right down the hill. But this seemed better. It was more intimate, more personal. As with J-Walt, when we applauded something, Neilson would take his cue from our response and play with the element, the screen being his canvas and we being his patrons.

As artists discover new ways to apply technology, new interactive experiences will evolve where the interactivity itself is between the artist and the audience, with the dome acting as the interface between the two. As J-Walt and Neilson have shown, the possibilities are boundless.

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Project Profile: SM Tianjin Science Discovery Center

Project to include 330-seat digital planetarium

by Matthew Dawson, Forrec

Work has begun on the design of a new Science Discovery Center and planetarium in Tianjin, China. When completed later this year, the Science Discovery Center will feature a state-of-the-art 330-seat digital planetarium, interactive science exhibitions, a travelling exhibition program, a retail area, snack bar and event space. Rather than a typical standalone project, this one is for a science center integrated within a large-scale shopping mall.

The Science Discovery Center is being built as part of the massive SM Tianjin mall project. When complete, SM Tianjin will be among the world's largest free-standing malls, and almost 400,000 square meters in size with an additional 140,000 square meter parking structure. The mall design consists of three interlinked oval forms, each with four levels of retail. The Science Discovery Center will occupy about 3000 square meters on the third floor of one of the ovals.

The developer of SM Tianjin and the Science Discovery Center is Philippine-based SM Prime Holdings. SM Prime's vision is be a leader in world-class mall development, committed to delivering on the daily needs of millions by offering a total mall experience and creating a richer, better, quality of life. The Science Discovery Center's vision is to strive to become the premiere destination that presents a well-balanced experience of learning and leisure; to foster awareness, interest and appreciation of science and technology, and to improve the community's quality of life. The Science Discovery Center, as a visitor attraction geared to the family market, will play a critical role in the mix of retail and leisure offerings within SM Tianjin. Especially in the early years of the mall's operations, the Science Discovery Center will serve to draw families to the mall where it is located some distance from the city center.

The Science Discovery Center in Tianjin will be the third built by SM Prime, and the first outside of the Philippines. The first Science Discovery Center opened at SM Mall of Asia in Manila in 2006. A second opened in Lanang, Philippines in 2013. Based on the success of the first two Science Discovery Centers, the Tianjin project will be larger - with twice the seating capacity in the planetarium - and the first to be designed by Forrec, Ltd. of Toronto.

The Design

Forrec's goal with the design of the SM Tianjin Science Discovery Centre is to make science interesting, enjoyable and interactive for visitors of all ages. In creating an informal learning experience, Forrec's design will expose visitors to scientific concepts in fun ways that fuel an interest in science, an interest that can be further explored elsewhere and in school.

The Science Discovery Center is being built as part of the massive SM Tianjin mall project. *Renderings courtesy of Forrec*

The target audience is Tianjin families and school groups, with an expected high level of repeat visitation. The Science Discovery Center will shift its appearance to appeal to two different audience groups, a day-time one made up of school children and an evening audience that will shift to include teenagers and adults without children. During the day, the Science Discovery Center will be lit with natural light from overhead skylights. In the evenings, the exterior surface of the planetarium will serve as a dramatic projection surface, on to which moving images of our world will be projected.

Discovering the science of the Earth we share is the central theme of the design. Inspired by astronomer Carl Sagan's term "the Pale Blue Dot", the Science Discovery Centre will place sustainability, green design and care for the planet as the central design motif and storytelling principle. The planetarium itself will represent our shared world, and our experience of it. The storyline unfolds in exhibits grouped in three thematic areas that surround the planetarium:

1. Our Dynamic Earth: Earth Sciences and Climatology
In this area, visitors will experience the forces that shape our planet, starting with the fundamentals of materials science, and including a special emphasis on the drama of natural disasters such as avalanches, tsunamis, tornados and earthquakes.

2. Life on Earth: Ecology and the Environment
In this area, visitors will learn about the thin biosphere surrounding the Earth– the oceans, the land and the atmosphere - that supports all life, and what we can

do to protect these environments. Along with ecology, visitors to this area will discover new innovations in sustainable technologies.

3. Our Inner World: Health and the Human Body
In this area, visitors will explore the world within each of our bodies. Visitors will learn how good nutritional choices, fitness and healthy living are important for sustaining 'the world within' each of us. • • •

About Forrec
Forrec is a planning and design firm that specializes in the creation of entertainment and leisure environments world-wide. Recognized globally as one of the largest and most experienced firms of its kind, Forrec stands alone in its ability to balance design creativity, operational savvy and fiscal practicality. With built projects in over twenty countries, Forrec has mastered the art of making memorable experiences by building big ideas.

Migrating Butterflies

How SK films enabled "Flight of the Butterflies" to migrate to eight cinematic exhibition platforms

interview by IPM news editor Joe Kleiman

Jonathan Barker is recognized as a world leader in giant screen and specialty cinema. His fifth 3D film, "Flight of the Butterflies," which documents the migration of Monarch butterflies, is the current hit of the giant screen market and is newly available for fulldome exhibition.

For the past few years, IMERSA and GSCA have worked to foster dialog between the giant screen and planetarium communities to encourage this kind of "convergence" and increase the number of possible screening venues that distributors can serve. The continuation of that dialog is emphasized at IMERSA Summit 2014 (March 6-9 in Denver) where Barker will give a presentation about the cross-platforming of "Butterflies."

Please share the various formats in which "Flight of the Butterflies" is now available.

As a 44-minute feature, it is available in these formats:

- 1570 3D
- 1570 2D - Dome
- 1570 2D - Flat screen
- IMAX Digital
- 4K 3D Digital
- Fulldome Digital
- 2K 3D Digital
- HD

The 22-minute version is distributed in:

- IMAX Digital
- 2K 3D Digital
- HD

Finally, the 14-minute version is available in 2K 2D Digital.

Modifications were made in post for the film - shot for 3D - to play in 2D in IMAX Dome theaters. Did it have to undergo similar modifications for the fulldome screen?

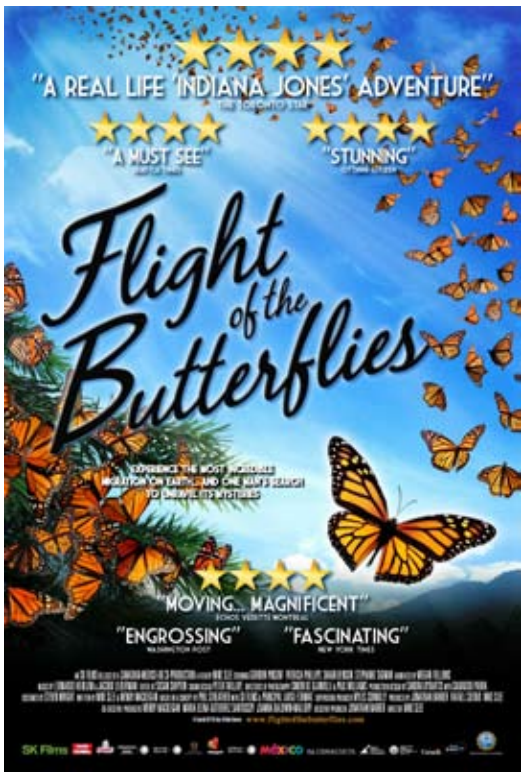
We created 3 digital intermediates for the film as our 3 core digital masters:

1. Version for film-out to 1570 3D
2. Version for film-out to 1570 Dome
3. Version for digital cinema

Version #2 was the digital asset delivered to E&S for creation of the fulldome master.

Will "Butterflies" be available in stereo 3D fulldome as well as 2D?

Whether that becomes the case in the future will depend on what we call "deal flow." The decision will be driven by the economics of creating the appropriate stereo fulldome master.



How did SK Films and Evans & Sutherland collaborate in bringing "Butterflies" to the fulldome screen?

SK did the work to create the master for dome screens (digital intermediate #2 above), which we then provided to E&S and reviewed with E&S the various parameters for creation of the fulldome master.

What is the thinking behind the multi-platform distribution model you've established for "Butterflies?"

In our current world of a world of an overall reduced per-screen revenue flow for films from the traditional Giant Screen market, distributors and film owners have to rely on increased deal volume to make up the gap, and that increased deal volume means you need multi-platform distribution – provided you have a strong enough title to be appealing across multiple platforms. • • •

K2 COMMUNICATIONS
www.k2communications.com

Mark Kresser
T: 310.563.2611 C: 310.463.6359
E: mark_kresser@k2communications.com

Ed Capelle
T: 541.345.8782
E: edwardcapelle@comcast.net

FULL DOME CONTENT THAT IS MORE THAN JUST OUT OF THIS WORLD