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Cover: A visitor to Science Park at the Montshire Museum of Science in Norwich, Vermont, gives the Up and Out exhibit a spin to see and feel the interaction of angular momentum and gravity high above the ground. Photo by Jon Gilbert Fox
Visitor Voices in Museum Exhibitions

Kathleen McLean and Wendy Pollock, editors

This book is a timely survey of ways museums are incorporating user-contributed content in exhibitions and other media. Overview articles by the editors, plus 29 other articles, describe a variety of experiments dating from the 1970s to the present—from comment books to sticky notes, video kiosks to blogs. For professionals and students alike, Visitor Voices offers inspiration, food for thought, and practical advice.

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Informal Science Learning: Unpredictable, Chaotic...and Viral!

I recently represented ASTC on the scientific advisory board of a large media group that held its annual retreat in the pristine Colorado wilderness. Gathered together were leading scientific researchers, innovators, captains of industry, technology-based investors and philanthropists, artists, and science communicators.

In a relaxed venue, this diverse group explored the science issues that are most vexing in our world today and the topics only just visible on the edges of the horizon. The group examined, as well, the constantly changing ways in which the public obtains (and retains) science information now and in the foreseeable future.

In this, my first opportunity to participate in the annual event, I offered information about how science centers and museums engage our communities in science and educate and inspire our youth. As the discussion proceeded, I could see the illuminating “light bulbs of understanding” in the room about the many ways in which science centers and museums can integrate with other forms of science learning to excite audiences. I, too, came away with intriguing new ideas about blended approaches to science learning.

But one message emerged perhaps most clearly in all of the discussions. While these many approaches to science learning may at times appear unpredictable or maybe even chaotic, today’s growing “Wikipedia culture” is generally comfortable with this fluidity. Our field does remarkably well in capturing this dynamic as we design our science center and museum activities.

As if there were any doubts that the simplest and most unpredictable of tools have the potential to yield the greatest impact, I attempted to dazzle my colleagues at the retreat by concluding my presentation with a brief discussion of the two-minute video of the “quantum levitation” demonstration by Tel Aviv University researchers at the 2011 ASTC Annual Conference in Baltimore this past October. This video (www.astc.org/blog/2011/10/26/quantum-levitation) received an astounding 5 million views in its first week on YouTube and was subsequently featured in international media (providing excellent publicity for ASTC, I might add.)

I was taken by the fact that so many in the group were already familiar with this arcane area of physics. Why? Because, as it turns out, nearly 90% of the august attendees at this event in the beautiful Colorado mountains had already seen the YouTube video themselves!

Anthony (Bud) Rock (brock@astc.org) is ASTC’s CEO. Visit ASTC’s website (www.astc.org) to read more From the CEO editorials.
It was wonderful to see a whole issue of Dimensions dedicated to traditional knowledge (November/December 2011) and to see the work of Cosmic Serpent recognized. Cosmic Serpent strongly influenced and supported the new U.S. National Science Foundation–funded Generations of Knowledge (GoK) exhibition project at Oregon Museum of Science and Industry (OMSI), which explores traditional ecological knowledge and Western science as valuable and complementary ways of knowing. Leaders and Fellows from Cosmic Serpent serve as key bridge people, advisors, and partners.

OMSI’s Salmon Camp for Native Youth also strongly influences our work with Indigenous knowledge and Native audiences. The toolkit Shaptákai: Ideas for Starting a Salmon Camp for Native American Youth is available at www.salmoncamp.org/toolkit.htm.

Victoria Coats, manager of exhibit research and development, and Steve Tritz, director of outdoor science education, OMSI, Portland, Oregon

Last year, I attended one of the Girls RISEnet workshops mentioned in Notes from ASTC in your November/December 2011 issue. I really appreciate that ASTC is putting on more localized professional development. While I may get paid to make silly putty, I take my job as an informal educator seriously, and seek out all the professional development I can find. Unfortunately, development for teachers is often at times that don’t work for those doing summer and afterschool programs, and ASTC’s annual conference is prohibitively expensive for science center educators. It’s encouraging to finally feel invested in!

Erin Nolan, public programs assistant, Saint Louis Science Center, Missouri

Send letters to the editor to dimensions@astc.org (subject line: Inbox). Include your name, title, and institution. We reserve the right to edit letters for publication.
DIGGING INTO CLIMATE CHANGE

What strategies would you use to reduce CO₂ emissions? What sacrifices would you be willing to make?

These are some of the decisions visitors make in the simulation game at the center of the 1,200-square-foot (110-square-meter) exhibition Earth Lab: Degrees of Change at the Marian Koshland Science Museum of the National Academy of Sciences in Washington, D.C. After identifying their priorities, players evaluate trade-offs as they try to lower CO₂ emissions to significantly reduce the impact of climate change. In the process, they discover there are different ways to address this complex problem.

In keeping with the museum’s mission to help people use science to solve problems, other exhibit components cover what’s happening with climate change, how we know, the causes and impact, and what can be done. Digital labels and interactives feature layers of information that enable visitors to choose how deeply they want to dig. “We were trying to make the information friendly and accessible to all visitors, but also provide rigorous scientific content,” says Richard Alley, chair of the exhibition’s scientific steering committee.

Funding for the $1.6 million exhibition, which opened on September 15, 2011, was provided by the museum and the National Academy of Sciences. Earth Lab will remain open for several years. —S.B.

Details: Erika C. Shugart, deputy director, ksm@nas.edu, www.koshland-science-museum.org/media/press_release_049.jsp

THROUGH A CHILD’S EYES

Big things are happening in children’s little brains and bodies. That’s the message of the Science Museum of Minnesota’s new permanent exhibition, Wonder Years: The Science of Early Childhood Development, which opened last April after two years of development. The exhibition includes displays and interactives on cognitive milestones during a child’s first five years, the importance of play and social relationships, and how scientists learn about children’s development.

In the 1,800-square-foot (170-square-meter) exhibition, located in the St. Paul museum’s Human Body Gallery, visitors can look through goggles to compare what a baby sees at birth, 1 month, and 3 months. Visitors can also try writing their names so they look correct in a mirror, in order to experience the concentration and frustration young children feel when learning. There are opportunities for parents to play and perform tasks with their kids, and videos to show nonparents what children can do at different ages.

The project also includes research and public programs that encourage dialogue among various members of the community. According to Eric J. Jolly, the museum’s president, “The goal of Wonder Years is to ensure that children benefit from the growing body of knowledge about the importance of early brain development.”

The project is a partnership between the museum, the Center for Early Education and Development at the University of Minnesota, and the nonprofit group Public Agenda. A $2.3 million grant from the U.S. National Science Foundation supported the project. The F.R. Bigelow Foundation donated an additional $46,000, and the Grotto Foundation contributed $20,000 for programming. —Sharon Barry

Details: Laurie Fink, director of science programs, lfink@smm.org, www.smm.org/wonderyears

Visitors get a sense of what the world looks like to a baby at 1 month and 3 months. Photo courtesy Science Museum of Minnesota
NEW AND IMPROVED

Last March, after undergoing the most extensive renewal in its 27-year history, Science North in Sudbury, Ontario, Canada, reopened its doors. Visitors found, among other things, highly interactive exhibits, a new object theater program, a renovated food court, and a more energy efficient building.

The 8,000-square-foot (740-square-meter) Northern Ecosystems exhibition underwent the most dramatic transformation. New and updated exhibits allow visitors to explore the forests, wetlands, lakes, and rivers of Northern Ontario and interact with live animals. They can also try on a rack of moose antlers, observe flying squirrels and bats in a nocturnal exhibit, and play with water and sand at a giant stream table.

The Government of Canada and Government of Ontario provided stimulus funds for the renewal project. The TD Friends of the Environment Foundation supported the renovated Northern Ecosystems exhibition, and the Northern Ontario Heritage Fund Corporation provided funding for a 4D show that opened in October 2011. Scotiabank and Department of Fisheries and Oceans Canada provided funding for new educational programs in the Northern Ecosystems area. —S.B.

Details: Marianne Zadra, marketing specialist, media and communications, zadra@scienecnorth.ca, www.sciencenorth.ca

EXPLORING LIFE’S ORIGIN

How did life begin? The answer to that question is one of science’s great mysteries. At the New Mexico Museum of Natural History & Science in Albuquerque, the new exhibition Emergence: A New View of Life’s Origin engages visitors in recent research on this topic, including discoveries made at New Mexico’s Santa Fe Institute (SFI). The 1,000-square-foot (90-square-meter) exhibition, which opened on July 1, 2011, is a collaboration between the museum, SFI, and New Mexico Highlands University (NMHU).

“The main premise of the exhibition is that life arose as a natural consequence of geochemical processes on the early earth,” says Mimi Roberts, director for media projects at the New Mexico Department of Cultural Affairs, the museum’s parent organization. The exhibition covers the earth’s geologic history, early life forms, the chemistry leading to life, and the formation of DNA and other biological structures.

The team included media arts students and AmeriCorps interns from NMHU. They designed a 16-foot (5-meter) timeline tracing the earth’s evolution over nearly 4.6 billion years, as well as interactives on the periodic table of elements, tree of life, and living cell. Visitors can also watch a 3D movie that tours New Mexico caves where micro-organisms have survived for millennia.

The exhibition was developed with a $162,822 grant from the U.S. National Science Foundation. —S.B.

Details: Roxanne Witt Celeskey, public information officer, roxanne.witt@state.nm.us, nmnaturalhistory.org/emergence

Above: A visitor explores the Make a Living Cell exhibit in Emergence. Photo courtesy NMMNHS
Below Left: Visitors watch a flying squirrel demonstration in Northern Ecosystems. Photo courtesy Science North

spotlights
WELCOME TO ASTC
The following new members were approved by the ASTC Board in July 2011. Contact information is available in the About ASTC section of the ASTC website, www.astc.org.

SCIENCE CENTER AND MUSEUM MEMBER
- The Future of Flight Aviation Center & Boeing Tour, Mukilteo, Washington. This organization offers the opportunity to tour a commercial jet assembly plant. With a 33,000-square-foot (3,070-square-meter) building, the center hosted more than 180,000 visitors last year.

SUSTAINING MEMBERS
- 3D Entertainment Distribution, Weybridge, Surrey, England, United Kingdom. The company produces, distributes, and markets films, including Sharks 3D and Air Racers 3D.
- EyeTech Digital Systems, Mesa, Arizona. EyeTech designs and develops eye tracking hardware and software, and has been developing cost-effective and flexible systems.
- Hoffman Design Works, Inc., Bloomington, Indiana. This company has returned to producing interactive exhibits for museums, after temporarily focusing exclusively on U.S. Navy projects.
- Mactus Pte Ltd, Singapore. This company develops and organizes events such as the International Aerospace Expo and Sesame Street Live Elmo’s Green Thumb.

PLANET UNDER PRESSURE
The international scientific community will convene in London, March 26–29, for the Planet under Pressure (PuP): New Knowledge Towards Solutions conference (www.planetunderpressure2012.net) leading up to the Rio+20 Earth Summit (www.uncsd2012.org/rio20) in June. Science centers all over the world will be organizing activities—such as debates, demonstrations, lectures, and films—linked to the PuP themes. In order for ASTC to promote the science center field at PuP and Rio+20, we need to have as many of our members organizing PuP events as possible. Participation will raise your profile and position your science center as part of an active global network. For more information, contact Walter Staveloz, wstaveloz@astc.org or (202) 783-7200 x118.

DIMENSIONS NEWS
We are pleased to welcome three new members to the Dimensions Editorial Advisory Board: Chip Lindsey (ScienceWorks Hands-on Museum, Ashland, Oregon); Paul Orselli (Paul Orselli Workshop (POW!), Baldwin, New York); and Erica C. Shugart (Marian Koshland Science Museum of the National Academy of Sciences, Washington, D.C.) Many thanks to our three outgoing editorial advisors for their guidance and support: Elsa Bailey (Elsa Bailey Consulting, San Francisco); Rita Deedrick (COSI, Columbus, Ohio); and Mikko Myllykoski (Heureka, the Finnish Science Centre, Vantaa).

Remember: Any paid staff member at an ASTC-member institution can request a free print or electronic subscription to Dimensions at members.astc.org. Spread the word to your colleagues. To purchase a gift subscription for a nonmember (USD 55 in the United States, USD 65 elsewhere, or USD 35 electronic edition), visit www.astc.org/pubs/dimensions.htm.

NEWS FROM CAISE
On November 17 and 18, 2011, the Center for Advancement of Informal Science Education (CAISE) convened a group of U.S. National Science Foundation (NSF) informal science education (ISE) principal investigators (PIs) and their evaluators in Washington, D.C., to explore what it means to work in networks as a mechanism for effective, cross-sector ISE impact. This convening was one of a series of workshops leading up to the CAISE 2012 NSF ISE PI Meeting, which will take place March 14–16 in Washington, D.C. Visit caise.insci.org for upcoming dissemination from the networks convening and other updates.

Future of Flight gallery at the Future of Flight Aviation Center & Boeing Tour. Photo by Randall Corcoran
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ASTC 2011 in Charm City

From October 15 to 18, science center and museum professionals gathered at the 2011 ASTC Annual Conference in Baltimore to network and share ideas in the spirit of the conference theme, Knowledge that Works: From Theory to Practice. When they weren’t immersed in one of 120 conference sessions, attendees had the chance to stroll around the Inner Harbor and sample Baltimore’s famous crab cakes and fudge-topped Berger cookies. A total of 1,718 delegates converged on Charm City, making this ASTC’s third highest attended conference. Attendees hailed from 34 countries, with the United States, Canada, the United Kingdom, Mexico, Israel, and Malaysia sending the largest delegations.

In the Exhibit Hall, 144 booths represented 121 companies, while 18 posters examined topics from science festivals to museum-library partnerships. The Exhibit Hall was also the site of a dynamic space displaying innovative technologies—one of three elements of SHIFT, a new strand of programming to amplify science centers’ role in showcasing innovation. (The other elements were a preconference workshop on new learning research, and an “armchair discussion” featuring Maker Faire’s Dale Dougherty, the New York Hall of Science’s Eric Siegel, and ASTC’s Anthony (Bud) Rock.)

Many thanks to our hosts at the Maryland Science Center, President and CEO Van R. Reiner and his hardworking staff and volunteers. We also thank Mikko Myllykoski (Heureka, the Finnish Science Centre, Vantaa), our outgoing Conference Planning Program Committee chair. We welcome our new co-chairs, Sharon Ament (Natural History Museum, London) and Angela Wenger (New Jersey Academy for Aquatic Sciences, Camden).

To learn more about ASTC 2011, read our blog (www.astc.org/blog/category/annual-conference), visit our Flickr pool (www.flickr.com/groups/astc2011), and watch videos—including the viral video of Tel Aviv University’s quantum levitation demonstration—on our YouTube channel (www.youtube.com/user/ASTCvideos).

**Officers, directors installed**

We are delighted to welcome ASTC’s new president, R. Bryce Seidl (Pacific Science Center, Seattle), and we are very grateful to outgoing ASTC President Nancy Stueber (Oregon Museum of Science and Industry, Portland) for her leadership. We also warmly welcome Linda Conlon (International Centre for Life, Newcastle upon Tyne, England, United Kingdom), vice president; Chevy Humphrey (Arizona Science Center, Phoenix), secretary/treasurer; and Joanna Haas (Louisville Science Center, Kentucky), member-at-large.

Two Board members—Dennis Bartels (Exploratorium, San Francisco) and Ann Fumarolo (SciPort: Louisiana’s Science Center, Shreveport)—were re-elected to a second term. Four new Board members were also elected: Nohora Elizabeth Hoyos (Maloka, Bogota, Colombia); Neville Petrie (Science Alive! The New Zealand Science Centre, Christchurch); Stephanie Ratcliffe (Wild Center, Tupper Lake, New York); and Barry Van Deman (Museum of Life and Science, Durham, North Carolina).

Our thanks go to our outgoing Board members, including Immediate Past President Lesley Lewis (Ontario Science Centre, Toronto); Member-at-Large Erik Jacquemyn (Technopolis, the Flemish Science Center, Mechelen, Belgium); Graham Durant (Questacon, the National Science and Technology Centre, Canberra, Australia); and Charlie Trautmann (Sciencenter, Ithaca, New York). For a complete list of Board members, visit www.astc.org/about/governance.htm.

**Johnson receives Fellow Award**

On Saturday morning, Colin Johnson, former director and CEO of Techniquest, Cardiff, Wales, United Kingdom, received ASTC’s highest honor, the ASTC Fellow Award for Outstanding Contribution. Immediate Past President Lewis cited Johnson’s “distinguished career as a chemist and educator, from the classroom to the museum. Colin’s determined advocacy, tactful diplomacy, and persuasive compositions have helped build bridges within the field and between science centers and the people they serve. His generosity and dedication know no limits.”

**Fascinating speakers**

We were fortunate to host four outstanding featured speakers this year. On Saturday morning, keynote speaker and
New Yorker staff writer Michael Specter discussed the contradictions between scientific evidence and public perceptions on issues such as vaccines and genetically engineered food.

On Saturday afternoon, Ellen Futter, president of New York City’s American Museum of Natural History, urged science centers to take an active role in improving formal science education, while National Science Teachers Association (NSTA) President Patricia Simmons outlined common goals between NSTA and ASTC.

On Sunday, Owen Gaffney, director of communications at the International Geosphere-Biosphere Programme, Stockholm, Sweden, examined how human impact on the planet has increased exponentially since 1950.

Seven ‘Edgies’ awarded
Six ASTC-member organizations and a science center professional were honored with the 2011 Roy L. Shafer Leading Edge Awards. These awards commemorate the late Roy L. Shafer, a former science center director and ASTC president.

Now in their seventh year, the “Edgies” recognize both small and large ASTC members and their employees for extraordinary accomplishments in Business Practice, Visitor Experience, and Leadership in the Field during the past three years. Recipients receive an etched glass award and a paid registration to the following year’s conference. Jury chair Marti Cortez (Saint Louis Science Center, Missouri) presented the awards.

The jury gave two Leading Edge Awards for Business Practice. The first went to the U.K.’s International Centre for Life, which runs on revenue generated from two onsite cafés, leases to nightclubs and university labs, and other sources. (See Dimensions, September/October 2011.) The second Edgie in this category was awarded to Philippine Science Centrum, Marikina City, Metro Manila, which reopened less than six weeks after Typhoon Ondoy submerged the building. (See Dimensions, July/August 2011).

Two institutions were chosen to receive the Leading Edge Award for Visitor Experience, small center. The first, Amazement Square, Lynchburg, Virginia, was honored for Amazing Adventures of Scopy Bug, a curriculum-based cartoon series to help educators teach science topics. In addition, Oak Hammock Marsh Interpretive Centre, Manitoba, Canada, was recognized for its wetlands outreach program, which reached 56,000 Canadian students, as well as teachers in six Caribbean locations.

There were two winners in the category of Leading Edge Award for Visitor Experience, large center, as well. Chabot Space & Science Center, Oakland, California, was honored for the Bill Nye’s Climate Lab exhibition and its Climate Scout IDs. Chicago’s Museum of Science & Industry received the Edgie for Science Storms, which features more than 50 hands-on exhibits and 200 artifacts.

Finally, Clarence Sirisena (Science Centre Singapore) received the Leading Edge Award for Experienced Leadership in the Field for researching new approaches in traveling exhibitions and sharing his discoveries with the field. (See Q&A, page 50.)

We thank this year’s Leading Edge Awards jury, which, in addition to Cortez, included Rocío García Gómez (Museo Model de Ciencias e Industria, Toluca, Mexico); Margie Marino (North Museum of Natural History and Science, Lancaster, Pennsylvania); Grant Troop (Ontario Science Centre, Toronto); Todd Happer (Natural History magazine); Keith Ostfeld (Children’s Museum of Houston); and Erik Stengler (Museo de la Ciencia y el Cosmos, Tenerife, Spain). Special thanks to the Children’s Museum of Houston for hosting the jury deliberations.

Guidelines and nomination forms for the 2012 Edgie competition are available at www.astc.org/about/awards/leading_edge.htm. The application deadline is March 20.

Next stop: Ohio
ASTC will head to Columbus, Ohio, from October 13 to 16 for the 2012 ASTC Annual Conference (conference.astc.org), hosted by COSI. See you there!
Thank you to our sponsors
We express our deep appreciation to the following annual conference sponsors for their support of ASTC and their commitment to science centers and museums worldwide.

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Centers of informal science learning play a vital role in preparing the next generation of workers and advocates in science, technology, engineering, and math. PGAV helps leading institutions achieve success with innovative design and smart economics.
Should science centers and museums adopt ethical guidelines regarding corporate sponsorships? If so, what should these guidelines be?

To ensure accountability and informed decision-making regarding corporate sponsorships, institutions should develop written and board-approved policies to protect their assets and reputation and to guide institutional actions consistent with their mission. The American Association of Museums’ Guidelines for Museums on Developing and Managing Business Support (www.aam-us.org), the Association of Fund Raising Professionals’ Donor Bill of Rights, and Board Source’s sample policies and white papers (www.boardsource.org) are useful resources.

Erik G. Pihl, vice president for development, Pacific Science Center, Seattle

Unlike philanthropic donors, corporate sponsors exchange funds for benefits that advance their marketing objectives. Inherently, the goals of the sponsor and the institution will be different, but they don’t have to be in opposition. From my experience, there are countless ways to fulfill sponsor benefits without surrendering a museum’s integrity or control over its content.

Experienced sponsors respect a “content firewall” that prevents even the appearance of their intrusion into the substance of museum exhibitions or programs. Indeed, most sponsors acknowledge the “value” of working with a museum is maximized when such a barrier is discussed, understood, and carefully expressed in a sponsor agreement. This does not require the creation of new ethical guidelines for sponsorships, especially as most museums already have an ethics statement guiding employee behavior and all its programs.

Charles L. Katzenmeyer, senior vice president for external affairs, Adler Planetarium, Chicago

We have in place a board-adopted policy to ensure that Sciencenter maintains independence, acts with ethical integrity, and avoids actions that could compromise its relationships with members, donors, the media, and the public. Our policy not only includes a description of our process for entering into a sponsorship arrangement, but also specifically spells out how we manage potential conflicts of interest, priorities and exclusions, sponsor recognition, documentation procedures, public accountability, and legal, tax, and accounting issues.

Lara Litchfield-Kimber, deputy director, Sciencenter, Ithaca, New York

Science centers need corporate partners for intellectual as well as financial support. Many of these companies believe strongly in our mission, and many are doing important work that can form the basis for great exhibits. Precisely because that is true, we need to make sure that we have clear and unambiguous guidelines in place, and that we know how far we are willing to go to adjust content in response to donor concerns.

Chuck Howarth, vice president, Gyroscope, Inc., Oakland, California

Visit www.astc.org/blog/category/astc-dimensions/viewpoints for an extended discussion of this question.

Tell us: Do you think science centers and museums should advocate for particular positions on political or controversial issues? Why or why not? Email dimensions@astc.org (subject line: Viewpoints), or post on our Facebook page (www.facebook.com/ScienceCenters). Include your name, title, and institution. Responses may be printed in a future issue or on our website. We reserve the right to edit responses for publication.
Emlyn Koster, president emeritus of Liberty Science Center in Jersey City, was named president and CEO of Institute for Learning Innovation (ILI) in Edgewater, Maryland, on October 7, 2011. Koster led Liberty Science Center for 15 years, and had previously served as director of the Royal Tyrrell Museum of Palaeontology, Drumheller, Alberta, Canada, and director general of the Ontario Science Centre, Toronto. He succeeds Beverly Sheppard and ILI’s founder John H. Falk.

On October 3, 2011, journalist and biographer Paul Hoffman was named president and CEO of Liberty Science Center, succeeding Emlyn Koster. David Hespe and Connie Claman co-led the center during the transition period. The author of 11 books, Hoffman has served as president and editor-in-chief of Discover magazine, president and publisher of Encyclopaedia Britannica, and editorial chairman of the website Big Think. He is creative director of an upcoming Rubik’s Cube traveling exhibition and an “evangelist” for the planned Museum of Mathematics, New York City.

Jill Measells became CEO of the Works in Bloomington, Minnesota, last October. Measells came to the Works from the Minnesota Children’s Museum, St. Paul, where she had served as vice president of learning experiences since 2006. She started her career in 1994 at Chicago’s Museum of Science and Industry, where she worked in several capacities, including as director of education. Measells assumed executive leadership from Rebecca Schatz, the organization’s president and founder.

On October 3, 2011, Tim Ritchie became president of the Tech Museum in San Jose, California. Ritchie previously served as president and CEO of the McWane Science Center in Birmingham, Alabama, for seven years. Prior to joining the museum field, Ritchie worked with nonprofit institutions whose missions centered on service, particularly for people who are disabled or disenfranchised. He replaces Peter Friess, who departed in March 2011 after five years at the museum.

The Saint Louis Science Center, Missouri, has named Bert Vescolani as its new president and CEO. Vescolani had most recently served as director of the John Ball Zoological Gardens in Grand Rapids, Michigan, and was senior vice president at John G. Shedd Aquarium in Chicago from 1991 until 2005. Vescolani replaces Douglas R. King, now president and CEO of the Museum of Flight in Seattle. Phil Needleman had served as interim president and CEO.

Alejandro Asin became ASTC’s new administrative assistant on November 8, 2011. A recent graduate of George Mason University with a bachelor’s degree in sociology and a minor in biology, Asin spent two months in Durban, South Africa, in 2010 to learn more about Indigenous knowledge and the local impact of HIV/AIDS. He succeeds Katie McCarthy, who has taken the position of team leader in the Volunteer Services department at Children’s National Medical Center, Washington, D.C.

One of South Africa’s premier science journalists, Christina Scott, died in a car accident in Cape Town on October 31, 2011. She was 49 years old. At the time of her death, Scott was managing editor at Research Africa and host of South Africa’s weekly Science Matters radio program. She previously served as president of the South Africa Science Journalists Association (2009–2010), sub-Saharan editor for SciDev.Net (2007–2009), and science editor at the South Africa Broadcasting Corporation (1994–2004). Scott was concerned about the state of science literacy in Africa, so she mentored many young science journalists. Many in our field last saw her as moderator of the plenary session on megatrends at the 6th Science Centre World Congress in September 2011. Her death is a tremendous loss to the informal science education community across Africa and worldwide. Tributes to Scott can be posted at www.facebook.com/groups/southafricanscience.
Blue Telescope uses technology, storytelling, and design to create engaging interactive exhibits and experiences. From multi-touch and mobile apps to games, quizzes, and social interactives, our innovative solutions use the latest technology to educate, communicate, and connect with your visitors.

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what we learned

Focusing the Vision

By Dennis Bateman and Kim Amey

As Carnegie Science Center (CSC) celebrates its 20th anniversary, we are developing Vision:2020, a long-range plan to strengthen mission-driven programs and exhibits, enhance the visitor experience, and improve revenue sustainability. The team developing this plan has worked hard to keep the following things in mind:

1. **Be introspective.** Our process involved benchmarking with peer institutions, using ASTC statistics as the basis. We took an objective look at our budget and identified ways to improve our operations and add new revenue streams.

2. **Don’t throw the baby out with the bathwater.** We used careful audience evaluation, both low tech (hiding behind a pillar and watching) and high tech (see #3), to examine what parts of our experience were iconic, and what parts would not be missed. To some things the staff felt were critical, the visitors said, “Not so much.” And some experiences we were ready to sideline rated very highly. It’s important to balance what an audience wants and what you believe they “need.”

3. **Consider the entire visitor experience.** With parking, ticket purchases, restrooms, and snacks, it’s possible for a visitor to be at your site for 30 minutes before entering a gallery. We were fortunate to get a leading research firm to help us analyze our entire visitor experience through the emerging field of neuromarketing. Over 400 visitors, wearing ball caps surreptitiously outfitted with brain-wave sensors and 3D GPS, visited the science center (without our staff knowing). The data collected formed maps of the visitors’ moods and reactions—pleasure, surprise, frustration, anger, etc.—keyed to the time and GPS location within the center. The resulting charts and post-visit interviews told the tale—delight in the galleries was offset by disappointing amenities in need of major facelifts. These results also cued us in to the idea that vistas overlooking a gallery were visually pleasing and useful for orientation and that natural light trumped darker spaces (even if the spaces were intentionally dark to convey a mood).

4. **Keep local connections.** For our institution, “home-grown” visitorship is critical. Our native/tourist attendance is about 60/40, and most out-of-towners visit with local friends and relatives. Also, as part of our mission, we aim to help develop the local science and engineering workforce. So our topics for expansion mirror local industries: robotics, energy, and medicine/health. The other shift in focus will be toward our riverfront, considered our “back door” in the waning steel-mill days, when the rivers were something you stayed away from.

This mix of gut and research has shaped the Vision:2020 plan that will determine the CSC of the future. Check in from time to time to see how we’re doing!

Dennis Bateman (BatemanD@CarnegieScienceCenter.Org) is director of exhibit experience, and Kim Amey (AmeyK@CarnegieScienceCenter.Org) is project manager, at Carnegie Science Center, Pittsburgh.

If you would like to write about what your institution has learned from a project in exhibit development, education, finance, and/or operations, contact us at dimensions@astc.org (subject line: What We Learned).
Perspectives on Science Center Exhibitions

Exhibitions are perhaps the most quintessential and exciting element of science centers’ work. In this issue of Dimensions, we examine the exhibition philosophies of various institutions, as well as the design principles that lead to great exhibition experiences. In addition, we explore the advantages of tinkering and prototyping in house, the benefits and drawbacks of hosting a major blockbuster, the importance of community in the exhibit development process, and creative ways to extend the exhibition experience post-visit. We hope some of the questions and ideas raised here will form the basis of a future ASTC Community of Practice on exhibits. Visit www.astc.org/profdev/communities to learn more.

Two visitors explore the Dual Mirror exhibit at Phaeno in Wolfsburg, Germany. Photo courtesy Phaeno/Marek Kruszewski
Designing Exhibits for the Experience

By Robert L. Russell

I believe that a key reason people visit museums and science centers is to see and experience the “real thing” not easily experienced in everyday life. People want to see the “plastinated” bodies in Body Worlds, play with light and magnetism at San Francisco’s Exploratorium, and watch sharks at an aquarium.

Surveys show that aesthetic, educational, social, and affective motivations bring people to museums (Smithsonian, 2007). These motivations all derive from visitors’ anticipated experiences. While funders like the U.S. National Science Foundation and Institute of Museum and Library Services are interested in the impacts or outcomes of the exhibits they fund, visitors must have experiences for there to be outcomes.

With the great emphasis on outcomes, we may shortchange the attention given to the exhibit experience itself. Science centers must design for visitors to “see and do.” Based on the rich research findings about how we learn, think, and behave in museums, I have identified 10 guidelines for developing well-designed, experience-based exhibits.

1. **Provide advance organizers.** Visitors may have little experience with the exhibit content, so it should begin with something familiar. An obvious starting point allows visitors to begin easily and confidently in a “low-risk” environment. A title, an introduction, or thematic areas to identify the “big ideas” or major themes may help visitors make connections.

2. **Design inviting environments.** Design exhibit environments and elements that visitors find attractive, comfortable, welcoming, and easy to get involved with. Minimize distractions.

3. **Design accessible and easy-to-use exhibits.** For many, an interactive exhibit is like a new and unfamiliar product. Some exhibits are easy to use, but others are confusing. For a productive and fulfilling visitor experience, design for simplicity and visibility. Design so visitors can easily see how to use the controls, understand the relation between actions and results, and observe the effects. Design for error so visitors can easily restart. Also, standardized exhibit graphics and interfaces help visitors generalize some functional knowledge from one exhibit to the next.

4. **Present real objects and phenomena.** Visitors want the “real thing.” Use real objects and phenomena to design emotionally and intellectually involving experiences, which can include the “Wow!” factor.

5. **Meet visitor expectations.** Use designs that pique curiosity, surprise, and intrigue to meet visitors’ expectations for learning. Design so visitors can have some fun.
6. Provide entry points to meet individual needs. Prior knowledge, life experiences, and interests guide our museum experiences. Visitors often find an effective entry point in an exhibit with something familiar or a problem or question they find challenging. These entry points, some of which might be called “hooks,” can often be identified through front-end evaluation.

7. Offer choices, control, feedback, and success. Visitors can personalize their visit if they have choices, exert some control over their experiences, and get feedback on the consequences of their choices. Visitors’ actions should produce rapid, clear results, and they should be able to try different actions and observe different results. Exhibits should allow for success, which means visitors reach a satisfying point along the inquiry path.

8. Support experiences with text or audio. Exhibit text or audio can directly support visitor experiences by identifying what’s there, pointing things out, suggesting things to do, raising questions, and connecting an exhibit to other exhibits.

9. Encourage social experiences. Since visitors often come to museums with friends and family, encourage social interactions through text or audio. Allow enough space for more than one person to view or (if practical) use an exhibit. Exhibit explainers can also enrich experiences through informal interactions, often facilitated by “discovery” carts.

10. Evaluate. Like any new product, an untested exhibit can have serious flaws. Front-end and formative evaluation—finding out what visitors know, what kinds of exhibit experiences they prefer, and how well prototype exhibits work—can help improve the relevance, functionality, and effectiveness of exhibits. Summative evaluation—done after an exhibit goes on display—can help assess the overall effectiveness and outcomes of exhibit experiences, as well as identify any aspects of exhibits that could be remediated or revised to make them even more effective.

If you design exhibits with these qualities in mind, your visitors will demonstrate “outcomes” like awareness, interest, and understanding, they will have rich experiences, and they will come back!

Robert L. Russell (eldrbob@gmail.com) is senior education associate at the National Center for Interactive Learning/Space Science Institute, and a consultant to informal learning organizations. He is based in Washington, D.C.
Top left: The Aurora exhibit shows how reflections are created by both the shape of the light and the shape of the reflector. Photo courtesy the Exploratorium

Above right: Families enjoy the shark tunnel at Adventure Aquarium in Camden, New Jersey. Photo courtesy Adventure Aquarium

Left: Butterflies are released daily at Magic Wings Butterfly House at Museum of Life and Science, Durham, North Carolina. Photo courtesy Museum of Life and Science

REFERENCE


RESOURCES FOR DESIGNING EXPERIENCE-BASED EXHIBITS


Creating ExhibitFiles

By Wendy Pollock and Kathleen McLean

Opening ExhibitFiles (www.ExhibitFiles.org) in April 2006 was like opening a public park. There was a vision and a setting—but until people began to arrive, this community website for the exhibition field was almost literally empty.

We had projected that perhaps 100 people would join and contribute 30 exhibition case studies. Five years later, membership exceeds 2,000 and continues to grow, with nearly 390 case studies and reviews posted to date. Instead of the projected 1,000 visits a month, the site regularly exceeds 5,000.

When we (ASTC, Ideum, and Independent Exhibitions) received U.S. National Science Foundation (NSF) funding to develop ExhibitFiles in January 2006, we conceived of the site as part archive and part community. It would be a place to preserve and share experiences and build reflective exhibition practice. The site—including its architecture, software, user interface, and what we came to think of as its human system—was designed to be a work in progress.

We have been able to extend a three-year grant to cover six years of work, three rounds of evaluation, and two major redesigns.

Although the NSF grant ended in December, program officers have come to speak of ExhibitFiles as part of the “infrastructure” that supports work in informal science education, and we are grateful that ASTC remains committed to maintaining the site.

As with many other design experiments, along the way there have been insights and unexpected delights as well as some dilemmas still unresolved. With the benefit of evaluation findings and critical review by friends of the site, we share here some observations and reflections on what might happen next.

DELIGHTS
We have delighted in watching ExhibitFiles grow into an international and interdisciplinary community of practitioners who join together for inspiration, knowledge building, and critique. Members come from 57 countries and a wide variety of museums, academic institutions, and other organizations. Evaluation tells us that while some members post case studies and reviews to raise their professional visibility, more altruistic motivations—like contributing to their professional community—are at least as common.

Many case studies have been about science exhibitions, 26 of them NSF-funded, including classics like the Smithsonian National Museum of Natural History’s Discovery Room in Washington, D.C. (Judith White), and more recent award-winners like the Huntington Botanical Garden’s Plants Are Up to Something in San Marino, California (Karina White). But over time, we have seen more posts about art galleries and offbeat museums like St. Louis’s City Museum (Jason Jay Stevens). The site provides us with both delightful and haunting glimpses of
From left to right, co-author Wendy Pollock, “golden” award winners Jason Jay Stevens and Tom Nielsen, and Ideum’s Jim Spadaccini gather at the ExhibitFiles reception at the 2009 ASTC Annual Conference. “Golden” awards are given in recognition of outstanding contributions to ExhibitFiles. Photo by Christine Ruffo

places near and far—from Austin, Minnesota’s Spam Museum (Dan Spock) to the Choeung Ek Genocide Museum near Phnom Penh, Cambodia (Mary Marcussen).

ExhibitFiles includes both thorough pieces by museum elders and first attempts at review by museum studies students on assignment. The sense of camaraderie, common purpose, devotion to the larger museum field, and sometimes even celebration is evident in contributions and comments. In addition, participants have told project evaluator Carey Tisdal why they value the site. “I love, love, love the case study forum,” said one participant. “That alone provides insight into design and exhibits that is invaluable to designers who don’t have large travel budgets. It is great for inspiration as well as critical reflection.”

DILEMMAS
We have also identified some areas where ExhibitFiles could be improved. As content builds beyond original expectations, findability becomes more important. We have added open tagging and a browse page. But search functionality is still not what we wish it would be, and evaluation suggests this contributes to a sense that the site is slowly getting bogged down.

People want places to discuss issues and listen in on important conversations. But we wonder whether the current format of ExhibitFiles will be sufficiently adaptable given how much has changed since early 2006. Back then, Facebook wasn’t in general use and Twitter was just on the horizon. It’s now so easy to start a blog or create an online presence that the role of centralized gathering places is an open question. What happens, then, to a devotion not only to my online profile but also to our common field?

WHAT NOW?
Although the media landscape has changed in recent years, the need for shared experience, reflection, and inspiration has not. The fact that people continue to join ExhibitFiles—even though some may hesitate to disclose details of their own experience or venture a review—seems to us evidence of a continuing thirst for what communities at their best have to offer.
In which of the following ways has ExhibitFiles influenced your work?

<table>
<thead>
<tr>
<th>Way</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encouraged me to be more reflective about my work</td>
<td>51.2%</td>
</tr>
<tr>
<td>Inspired me to try an innovative approach</td>
<td>32.9%</td>
</tr>
<tr>
<td>Provided strategies for presenting a...</td>
<td>30.2%</td>
</tr>
<tr>
<td>Has not influenced my work</td>
<td>26.7%</td>
</tr>
<tr>
<td>Kept me from “reinventing a wheel”</td>
<td>26.4%</td>
</tr>
<tr>
<td>Led me to new technologies</td>
<td>24.0%</td>
</tr>
<tr>
<td>Helped me avoid mistakes or problems</td>
<td>14.7%</td>
</tr>
<tr>
<td>Provided methods for specific audiences</td>
<td>11.2%</td>
</tr>
<tr>
<td>Led me to new collaborators</td>
<td>8.9%</td>
</tr>
<tr>
<td>Provided information for a grant proposal</td>
<td>6.2%</td>
</tr>
<tr>
<td>Other</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

WAYS ExhibitFiles has influenced work (n = 259).
(Respondents could select multiple options, so responses do not total 100%.)

What might help ExhibitFiles remain of service to the exhibition community? Here are some things we hope the site and its community will accomplish in the coming months and years:

• **Welcome.** Much of the richness of ExhibitFiles comes from its embrace of the whole museum exhibition community, not just science centers. Members of the site have recommended that ExhibitFiles be more explicit in its inclusion of all sectors of the museum field. We agree.

• **Remember.** From the beginning, we hoped ExhibitFiles would be hospitable to both new discoveries and old traditions. As the site has evolved, however, current reviews and recently completed projects have tended to take center stage. But there is much wisdom in past experience. We want to see more reviews and case studies of older, classic exhibitions. One of co-author Kathleen McLean’s first posts on ExhibitFiles quotes Canadian designer Bruce Mau: “Growth is only possible as a product of history. Without memory, innovation is mere novelty. History gives growth a direction.”

• **Take risks.** Every exhibition is an opportunity to see the world in a different way and tempt people beyond their comfort zones. We want to see more criticism and deep reflection on ExhibitFiles—that’s what other members have told the evaluator, too. We wonder: What would have to happen to make ExhibitFiles more congenial for conversations that wake us up and shake us up?

We are grateful to NSF for taking a risk with this project and to our collaborators, the Ideum programming and design team led by Jim Spadaccini, and evaluators Randi Korn (front-end studies) and Carey Tisdal (remedial and summative studies). And we are grateful to our Core Contributors who were the first to venture into the new and empty public park. We look forward to continuing our own participation—and to contributing our own pre-internet memories and provocations.

**Wendy Pollock** (wendy.pollock@gmail.com), a Chicago-based writer and editor and former director of research, publications, and exhibitions at ASTC, was principal investigator (PI) of ExhibitFiles. **Kathleen McLean** (kmclean@ind-x.org), principal of the museum consulting firm Independent Exhibitions, was co-PI. To learn more about ExhibitFiles, contact Wendy Hancock (whancock@astc.org).
On Growth and Form: Patterns in the Evolution of Exhibits

By Stuart Kohlhagen

Nearly 200 years ago, Charles Darwin began his voyage of exploration, collection, and interpretation. It was an age of discovery. Gardens of exotic plants and animals brought the public into contact with wonders from parts of the world they would never otherwise have experienced. Cabinets of curiosities from private collections were opened, enlarged as museums, and displayed to the public. The motivation behind sharing objects and ideas formed one of the roots of the science center movement.

In 1980, Questacon, Australia’s National Science and Technology Centre, in Canberra, started as a small research project run by a university lecturer and a group of passionate volunteers. I was one of those volunteers. As Questacon grew to become a national institution with an international footprint, I moved from volunteer to exhibit designer, spent time as head of exhibition development, was involved in our master planning, and am currently manager of research and development. Having grown up in a science center and watched the trajectory of many others, I have been struck by some broad patterns in the evolution of exhibit development.

SIMPLE BUT EFFECTIVE
One pattern is that small centers frequently rely on technically simple exhibits, often because they operate with limited staff, budgets, and fabrication options. They leave the phenomena to do the heavy lifting. In this context, good exhibit design has meant not distracting from the effect of the phenomenon on display.

When Questacon opened, we displayed a dozen simple exhibits, such as a harmonograph and Chladni plates. By the mid-1980s, Questacon acquired its first computers—as exhibits—an IBM 5150 and an Apple IIe. (The PC/Mac divide really is that old.) One computer took visitors through the story of Australian steel manufacture, and the other ran a quiz on animal classification. Today, those computers have gone to the landfill, but the simple harmonograph continues to fascinate visitors every day as it creates ever-new patterns.

THE RISE OF THE TEACHING MACHINE
During the early 1990s, technology allowed another pattern to emerge. Advances in display and control technologies combined with simpler and cheaper development tools (typified but not limited to computer-based systems) brought changes to the types of exhibits science centers could display. Exhibit developers were able to create interactive experiences for a wide range of subjects. We could now layer information, tailor the material to suit specific users, and pace the delivery of content. We could model and simulate processes like never before. We could even log visitors’ responses and convince ourselves that we were tracking their learning. The “teaching machine” had arrived.

Exhibit development now was able (and in some minds, obliged) to consider interfaces and information architecture to make the most of a visitor’s interaction with an exhibit. Some exhibits with an elaborate interface, such as a multitouch table, have successfully supported the extended exploration of the information embodied in the exhibit. In other cases—with the same technology—the only observable interaction is with the interface itself and not the content of the exhibit. We need to be able and willing to recognize the difference if our exhibits are to be of any service.
These two exhibits at Questacon exemplify the dichotomy of exhibits “of” and exhibits “about.” The bubble film projector (photo by Kami McLeod) allows visitors to interact directly with a real phenomenon, while the computer interactive (inset, photo courtesy Questacon) presents information about the embedded water in foods and products.

**DRIVEN BY DESIRED OUTCOMES**

These technologies have given rise to a pattern, too. They have allowed science centers to become communications partners for companies, government departments, and organizations that are keen to engage the public. These stakeholders commonly want to address target audiences, transmit key messages, and achieve certain outcomes. They want evidence of impacts. Emerging from this dynamic is the temptation (resisted by some) to develop exhibits with very specific messages and evaluate them against a narrow set of outcomes. For instance, one exhibit developed by Questacon used a computer interactive to highlight the embedded water in a range of foods and products, with the ultimate goal of promoting efficient use of water resources.

I feel that, in some cases, through our exhibit development process, we have tried to accommodate the expectations of stakeholders rather than take the time to educate them about what is both realistic and valuable. As a result, we might be tempted to overstate what an exhibit could achieve. The lack of positive evidence in an evaluation of “desired outcomes” might easily be interpreted as a failure of the exhibit, rather than a failure to understand what should be expected from a visitor interacting with the exhibit.

**A DICHOTOMY OF EXHIBITS**

Many years ago, I had the great pleasure to spend several hours chewing over exhibit development philosophies with the late Peter Anderson, long-time advisor and friend to many in the science center field, who shared with me his thoughts on another pattern in exhibit development. He described a dichotomy of exhibits: exhibits “of” and exhibits “about.”

Exhibits “of” might be exemplified by the “electric fleas” exhibit. These exhibits allow visitors to see, feel, hear, touch, influence, and interfere with a real phenomenon in all its complexity. People might have their curiosity awakened, if not feel some joy or wonder. In this type of exhibit, we hope visitors discover things for themselves.

Exhibits “about” most often have a specific message and target audience. They are frequently more didactic. We hide information in quizzes, place facts behind reveal panels, and create models and simulations. In this type of exhibit, we hope visitors discover what we want to tell them.

In an age when access to information has never been easier for many people, exhibit developers should reflect on the relative merits of exhibits “of” and exhibits “about.”

**A FOREIGN LAND CALLED SCIENCE**

I sometimes think of science as another country. Science centers may serve the role of an embassy or travel agent, helping people understand the culture and overcome the language barrier of this foreign land. Some science centers even run guided tours and encourage people to consider working “overseas” in a science career.

Some exhibits are like postcards, fascinating visitors with the beauty and wonder of a phenomenon. Other exhibits serve as documentaries, providing more detail and context. Just as a successful tourist campaign benefits from many strategies, we can use exhibits from the simple to the complex to help audiences understand that, while science may be another country, it is an integral part of our world.

It’s still an age of discovery.

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**Stuart Kohlhagen** (SKohlhagen@questacon.edu.au) is manager of research and development at Questacon, Australia’s National Science and Technology Centre, Canberra.
Internal Capacity: Making a Good Museum Great

By Paul Orselli

When I think about the most enjoyable and memorable places—truly great museums—that I’ve visited over a lifetime of avid museum-going, the ones that bubble to the top include the City Museum, St. Louis; the Exploratorium, San Francisco; the Minnesota History Center, St. Paul; and the Pittsburgh Children’s Museum. When I think about the traits such a disparate group of institutions might have in common, I keep coming back to one thing: internal capacity.
By “internal capacity” I mean a museum’s ability to handle core functions like exhibit development, design, and fabrication with its own resources (human and otherwise). Not so long ago, this type of internal capacity was standard operating procedure for museums: “People visit us to see exhibits, and we make the exhibits they come to see.” Today, this notion of internal capacity, especially as it relates to exhibits, seems to be less common. New museums often open without any exhibits workshop space or staff, and more established museums are whittling their exhibits department to a skeleton crew, or in the worst cases, to nothing.

You may think it odd that as a consultant who creates exhibits for museums, I promote internal capacity as an integral part of a great museum’s function. But for the majority of the more than 30 years I’ve been in the museum field, I’ve worked as director of exhibits at several fine institutions, so I’m very sensitive to the internal needs of museums, especially smaller museums. Now, some of my favorite consulting clients are museums that want to create or expand their internal capacity. I really believe that internal capacity matters both for individual museums and for the broader museum field for several reasons.

**SOLVING PROBLEMS WITH STUFF**

Museums with strong internal capacity have an exhibits workshop and they test ideas. Creative ideas and exhibit solutions can’t just be switched on or off during a meeting or conference call. Having access to exhibit materials and a place to “mess around” with them is an essential part of exhibit making. Inspiration can strike at any moment, and there is no substitute for being able to test ideas right away by traveling a few feet from your workshop to your galleries.

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If you don’t currently have an exhibits workshop, carve out some backstage space (even if it means adding a wall in an exhibit gallery) to keep some simple tools and a work surface. If you’re starting a new museum, don’t let an architect or space planner talk you into minimizing the size of this essential area! Having some “creative space” for noodling around with ideas will increase your capacity to solve your exhibit design challenges.

Having an exhibits workshop goes hand in hand with the notion of testing. Whether you call it prototyping or getting visitor feedback, there is no more effective means of determining whether your ideas “work” with your audience than by putting physical components into their hands and finding out what they do with them.

**CHANGE IS NOT JUST GOOD, IT’S ESSENTIAL**

Exhibit components, especially the interactive exhibits found in science centers, need to change over time. You might need to switch out a handle, rewrite a label, or update an entire suite of devices. If the people and tools that created your exhibits are inside your museum, modifying such things becomes much easier.

The complexity of making changes to exhibits increases dramatically, and the likelihood of the changes occurring at all decreases proportionately, with your creative partners’ distance from your museum’s front door. If you are still building your internal capacity, consider working with partners, designers, and fabricators in your local community so that you can easily visit them during the entire exhibit development process.

There’s no substitute for putting physical exhibit prototypes into the hands of museum visitors. Photo by Paul Orselli
A MUSEUM EXHIBIT MONOCULTURE?
An increasing trend is to “outsorce” exhibit design, development, and fabrication to outside firms or to a small set of larger museums. There are certainly times when you may need to outsource an exhibit project. However, if the majority, or entirety, of your exhibit development and implementation happens outside your institution, you may be reducing the diversity of approaches to exhibits in the entire museum field. Every exhibits company and exhibit-creating museum has its own style (just like an author has a writing style), and the museum business becomes more diverse and stronger by sharing and learning from all these different approaches to creating exhibits.

Outsourcing all your exhibits also has the downside of your museum losing a valuable source of staff development. What are the folks in your exhibits department doing if they’re not learning new ways to create exhibits for your institution? If the answer is that they’re fixing exhibits, I say you have a maintenance department, not an exhibits department. While maintaining your exhibits is an important part of the process, it’s not the same as developing and building exhibits.

By now you may be thinking, “Internal capacity sure sounds like a great idea, but can we really do everything ourselves? Aren’t there times we should bring in outside people?” When creating exhibits, there are certainly many opportunities to work with outside people, whether local community members or consultants from within the museum field. But even these opportunities should be viewed as ways to help build internal capacity. For example, if you need to expand your museum’s internal expertise in exhibit evaluation or in learning new exhibit technologies, try to enlist an outside creative partner who is willing to share skills and help build your institution’s knowledge base.

An old adage says, “Give someone a fish and you feed them for a day. Teach someone to fish and you feed them for a lifetime.” In the same way, you should constantly be on the lookout for ways to increase your institution’s internal capacity, not just for the length of a consultant visit or the run of a grant project, but for the long-term future of your staff and museum.

There is no more effective means of determining whether your ideas “work” with your audience than by putting physical components into their hands and finding out what they do with them.

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Paul Orselli (paul@orselli.net) is president and chief instigator at Paul Orselli Workshop (POW!) in Baldwin, New York.
Shared Creativity in Exhibit Development

By Betsy Adamson

During the exhibit development process, drawing upon the experiences of many people helps to create a wider range of opportunities for learners. At Explora, a small science center in Albuquerque, New Mexico, we have developed a process that benefits from shared creativity and relies heavily on internal prototyping and opportunities to experiment with “stuff.”

A MEETING OF MINDS
To begin our process, we gather a concept group of up to 20 exhibit, education, and visitor services staff and volunteers to start messing around with materials. We value how rich and stimulating this shared creativity is in a context where we actually are using stuff. Members of the concept group research the topic and make the first iterations of exhibit activity mock-ups, using cardboard, duct tape, and whatever materials they can find in the shop or in education kits.

Sometimes we vary our process by engaging the entire staff in institutionwide workshops, where we collect our early mock-ups or activity materials to see what people do with them. This has the added advantage of providing professional development and informing our entire staff of what we’re working on.

The concept group comes together periodically in support of a subgroup that works more continuously on the project. This subgroup is made up of five exhibit developers, a graphics developer, and three other staff members. Exhibit developers at Explora are responsible for all aspects of the process, from concept development through prototyping, build-outs of exhibit environments, installation, and evaluation.

EVALUATING PROTOTYPES
Because of the small scale and fairly loose style of our exhibits, it is easy to make numerous mock-ups and adaptations to improve the prototypes. On a current project, Math Core, Explora made 58 rough mock-ups of exhibits and progressively narrowed them down to 10 prototypes.

The concept group systematically assesses each prototype with regard to Explora’s Exhibit Criteria. The criteria include things like manipulative possibilities; aesthetics; transactivity (the idea that people, materials, and environments all change through engagement); and the fit with our pedagogy. We also ask questions like:

• Which prototypes best encourage conversation and cooperative learning among adults and children?
• How can the prototypes accommodate “experiential analogs” from people’s personal histories [as people learn by using past physical experiences as analogs of new experiences]?
• Which prototypes best invite people to create their own purposes and their own learning?
• Which will grow with people and which will they come back to repeatedly for five years or more?
• Which will encourage people to re-evaluate what they know?

Mock-ups and prototypes are used with staff and visitors at Explora as a means of continually moving an idea forward. As prototypes become sturdier, we leave them on the floor with visitors for longer periods, with all staff observing visitor transactions and exhibit developers working on iterations, including experimenting with graphics and the exhibit environment. Eventually, prototypes make it onto the floor as regular exhibit activities, although they are never considered finished and are subject to change as need requires and resources allow.
This openness to change means that exhibits continue to be prototypes even for visitors. The creativity shared by staff and volunteers during the exhibit development process becomes creativity shared with visitors during their learning process as together we modify the exhibits through their use. The goal is always to find better ways to provide all of us with deeper opportunities for creating our own learning.

Betsy Adamson (betsya@explora.us) is exhibits and operations director at Explora, Albuquerque, New Mexico.

PUTTING VOLUNTEERS TO WORK

While Explora has a relatively large staff for its size, many other small science centers rely heavily on volunteers for exhibit development.

For example, at Headwaters Science Center in Bemidji, Minnesota, the seven employees work with volunteers to design and build the majority of the center’s exhibits. The skills and availability of volunteers play a part in determining what exhibits the center builds. Laddie Elwell, executive director, gives an example: “A friendly stranger from the town of Blackduck, about 25 miles up the highway, placed a tiny model on my desk and asked if we would like him to build a harmonograph for the science center. We enthusiastically gave approval, especially because it wouldn’t cost us anything except scaffolding to hold the device. The scaffold was built by some energetic teenage boys who needed to work off volunteer time for the judiciary, and the wood was donated.”

Similarly, Chip Lindsey, executive director of ScienceWorks Hands-on Museum in Ashland, Oregon, says that exhibit development there “has relied upon passionate and highly talented volunteers, many of whom are scientists and engineers.” The center is starting to explore new ways for staff and volunteers to work together. Lindsey says, “Currently we are toy- ing with a wiki site to allow the exhibit manager to match exhibit needs with the volunteers’ abilities and time schedules.”

Lindsey adds, “No matter how the process finally manifests, the equation is the same. Its success will depend on finding the right people to commit their passion to the pursuit of something magical.” —B.A.
Seven Commandments of an Experience Design Company

By Esther Hamstra

NorthernLight, based in Amsterdam, designs exhibitions from concept to installation for science centers and museums worldwide. Through huge successes and considerable failures, through research, late night discussions, and intensive visitor observation, we are starting to grasp the virtues and sins of designing what we call “platforms for lifelong learning.”

From our personal convictions and scholars’ theories on learning, communication, and experience, we have developed our so-called “seven commandments.” Although the choice of words may imply otherwise, our seven commandments are not written in stone. After all, creative work cannot be done from a straightjacket of design principles. The seven commandments combine our beliefs about exhibition goals and planning, display methods, and content development, and are designed to spark discussion and inspiration within our team and to clarify our ambitions to our clients.

Survival at the Pole—co-developed by Museon in the Hague, Netherlands, and NorthernLight—combines Inuit artifacts with hands-on exhibits to show recent environmental and cultural changes in the Arctic region. Photo courtesy NorthernLight
1. THOU SHALT SPARK INSPIRATION.
Learning is more than acquiring new knowledge. The affective, social, behavioral, and psychomotor skills or outcomes for science center visitors can be just as valuable as the cognitive outcomes. Although we would applaud visitors walking away knowing Newton’s three laws of motion, we are not content until visitors’ happy faces show that they are associating science and technology with their own lives. To achieve this type of learning, we inspire visitors through both content and design.

Our team contains content developers who are passionate about the stories, facts, and theories of each exhibition’s subject, and designers who crave to use the newest and flashiest exhibition technologies. We often have to remind each other that we are not creating for ourselves, but for the visitors. Not all content needs to be included, and some content might be better conveyed with simpler designs. We also believe that sometimes it can be worthwhile to show the beauty of a phenomenon to inspire visitors, even if they don’t fully learn the science behind it. The goal is to create vivid visitor experiences that spark inspiration.

2. THOU SHALT TELL STORIES.
Storytelling contains elements—such as event sequences, personal viewpoints, and personal relevance—that make it a powerful tool for exhibiting science and technology subjects. Every subject, even sewage systems and discrete mathematics, can be brought alive with a fascinating story. For some subjects, it might feel far-fetched to develop a story, yet one can be found in logical but refreshing or unusual themes.

Also, as exhibition creators, we don’t have to be the storytellers. Increasingly, we use methods like inviting visitors to help during the design process, enabling user-generated content, and letting visitors contribute to the client’s research. These participative methods can give visitors ownership of their experience and create a desire to learn.

3. THOU SHALT CREATE FOCUS.
It is easy to include endless graphic panels, display hundreds of exhibits, and offer long audiovisual presentations. Such an exhibition might impress, but it would be disastrous for visitors. They would lose the will to explore it or else become too distracted to pay close attention.

To avoid overwhelming visitors, we design groups of exhibits in focused themes. Each theme has a variety of exhibit types to arouse visitors’ attention. To restore their attention reserves, we create places for contemplation and rest between the themes. We can also add virtual and online layers to customize and personalize the exhibition. In these ways, we create focus to attract and keep visitors’ attention.

4. THOU SHALT BE AUTHENTIC.
Why visit an exhibition with a limited amount of information when the internet supplies limitless information? Why visit an exhibition that is not accessible 24 hours a day? Why visit an exhibition at all? The answer to these questions is authenticity. By reading a book or surfing the internet, visitors can’t shake hands with a robot, be overwhelmed by the size of a dinosaur, or experience the non-intuitive forces of spinning gyroscopes.

In our designs, we look for authentic ways of displaying science and technology. For example, the exhibition High Tech Romans, which we co-developed with Museum Het Valkhof, Nijmegen, Netherlands; LVR-Landesmuseum, Bonn, Germany; Museon, the Hague, Netherlands; and Technopolis, Mechelen, Belgium, combines archaeological objects with hands-on exhibits and graphics of modern objects to show present-day application of technologies developed by the Romans.

5. THOU SHALT CREATE ACTION.
Our daily challenge is to design and develop the best display method to translate each topic into hands-on and minds-on experiences for active visitor engagement. Our goal is to spark visitors’ curiosity and enthusiasm for the content, not for the display method. For example, augmented reality, in which real-world and virtual elements are combined in a screen image, is rapidly gaining interest as a display technology. But in some cases—like showing a vehicle’s steering mechanism—visitors’ curiosity might be better sparked if they interact with a life-size physical model.

Also, action is not restricted to...
hands-on exhibits. Today’s science centers are melting pots of exhibitions, education programs, and events, all offering opportunities for visitors to learn actively. As well as designing exhibitions, we can help science centers develop programs or events to accompany an exhibition we’ve created. Moreover, we always incorporate plans for social media, mobile websites, games, and apps in our proposals. We believe these tools can engage visitors before they enter a science center building and long after they leave.

6. THOU SHALT CREATE TOGETHERNESS.
Exhibits can easily be designed for a single visitor, but this pitfall neglects the fact that most people visit a museum in a group, whether with friends, family, or schoolmates. Even a visitor exploring an exhibition as an individual is probably not alone in the hall and might encounter other visitors or explainers. Social interaction is an important contributor to learning, so we design exhibits and activities that enable or facilitate interaction.

7. THOU SHALT HAVE LOVE AND PASSION FOR THE VISITOR.
Many exhibitions, unfortunately, have been made to impress curators, sponsors, directors, or other designers. In contrast, we try to design exhibitions with love for the potential visitors. People from all corners of the world visit the exhibitions we develop, so understanding the audience’s demography, interests, expectations, and cultural background is critical for creating effective exhibitions. The thrill of observing visitors at an exhibition’s opening and discovering that they share the passion we have put into the exhibition is beyond compare. The opening of an exhibition is not the end of its creation; it is the beginning.

We believe that taking these seven commandments into account can help in the design and development of physical as well as social platforms that stimulate lifelong learning. We aim to develop experiences that not only affect visitors as they view an exhibition, but also inspire them to learn more about science and technology and how it can benefit them. We want visitors to build on their experience long after their visit to a science center.

Esther Hamstra (hamstra@northernlight.nl) is content manager at NorthernLight, the Experience Company, in Amsterdam, Netherlands.
What is your institution’s exhibition philosophy?

We encourage an interest in and curiosity about the physical and natural worlds by giving visitors the opportunity to become engaged with real objects and real phenomena. We value direct experiences, particularly those involving a kinesthetic connection to a phenomenon, the ability to observe a live creature, or an experience that allows a visitor to make a connection to the world outside. Our most successful exhibits are less about imparting information and more about creating opportunities for rich and memorable interactions and conversations.

Bob Raiselis, exhibits director, Montshire Museum of Science, Norwich, Vermont

“Our vision for our exhibitions centers not on the exhibits, but rather on those who use them. We provide experiences that encourage visitors to freely frame their own questions and to organize the exhibitions in their own ways. The act of organizing sometimes prompts a personalized understanding and encourages further inquiry. Our exhibitions succeed when they help our visitors understand their world better, or even when visitors simply have fun in a place filled with scripted bits of scientific wonder. And what of the phenomena themselves? Most must be seen, touched, heard, or even smelled to be understood. Otherwise, why would we need exhibits at all?”

Wolfgang Guthardt, director, Phaeno, Wolfsburg, Germany

Two central themes provide the foundation for our exhibition philosophy: (1) Exhibits are most effective when they present science in a multidisciplinary context of everyday human experience, and (2) Visitors learn about science by doing science. We believe that exhibits should:

- Inspire visitors’ curiosity, encourage their sense of play, and reward their participation with understanding.
- Make objects “come alive” and help visitors build connections between those objects and associated ideas, issues, and phenomena.
- Allow for modification to accommodate new discoveries and perspectives.
- Involve visitors informally but directly in the experimental process of science.
- Engage visitors in considering relevant issues and ethical questions related to science.

Joe Imholte, program director, special exhibits & exhibit services, Science Museum of Minnesota, St. Paul
When developing new exhibitions, we always take the following principles into account:

- The content should be about science and technology in the broad sense.
- The main goal is education, but we also want visitors to have fun.
- Interactivity is important. We aim for a mix of different types of interactivity (from bodies-on to brains-on) and the use of different senses.
- We offer the visitor a unique experience, but with links to daily life.
- Visitors should be challenged, but should always leave with a positive feeling about themselves.

Patricia Verheyden, experience director, Technopolis, the Flemish Science Centre, Mechelen, Belgium

When we design an exhibition, we ask ourselves: Is each exhibit authentic? Interactive? Explorative? Transparent? Can a variety of visitors access the content in different ways over multiple experiences? We value creativity and authenticity. We develop our exhibitions in-house because this creative collaboration inspires our staff, volunteers, and board, and infuses our entire organization with ingenuity. To facilitate accurate observations of natural phenomena by visitors, we provide genuine materials rather than models and we make evident the inner workings of all of our exhibits.

Karen Miel, director of research and innovation, CuriOdyssey, San Mateo, California

Our exhibitions have their starting point in the technology and design of the real world and include industrial machinery both in full and model scale. The approach in the exhibitions is holistic, creating wholeness and context and engaging all the senses. This concerns the exhibits themselves, the setting, the stage design, and the “spaces in between.” The reality-based concept of our exhibitions creates an inspirational learning environment that helps children and adults to put pieces of complicated processes together and explore the technology and science behind them.

Olle Nordberg, director, Teknikens Hus, Luleå, Sweden

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Karen Miel, director of research and innovation, CuriOdyssey, San Mateo, California

Three core beliefs guide our exhibitions. First, the visitor perspective informs all phases of our projects. In addition to front end, remedial, and summative evaluation, our extensive prototyping process allows us to mock up, evaluate, and revise all of our interactive ideas through an iterative process. Second, design truly matters. We believe an exhibition is more than a set of interactives. Our approach integrates individual exhibit components into a larger, designed, immersive experience. Finally, we question, change, or abandon ideas throughout the entire process to ensure that the final exhibition successfully meets our goals.

Rita Mukherjee Hoffstadt, assistant director of traveling exhibits and special projects, the Franklin Institute, Philadelphia

To read more exhibition philosophy statements, visit www.astc.org/blog/category/astc-dimensions.
Explore More: Extending the Visitor Experience

By Dan Bird

We all spend a lot of time funding, creating, and delivering engaging experiences. Evaluation studies have shown that our visitors engage for a few hours and often remember the experience later, but how do we take the next steps to extend the experience?

One of the strategic initiatives and long-term goals of At-Bristol in the United Kingdom is to embed opportunities throughout the center for visitors to “Explore More” by extending their experience online at a later date. We aim for visitors to build a portfolio of experiences that can be used to strengthen learning and promote repeat visitation.

We first began implementing Explore More (sign in at www.at-bristol.org.uk/exploremore, login: exploremore@at-bristol.org.uk; password: Dimensions) in our exhibitions in 2010. Using a familiar, Facebook-style interface, Explore More provides each visitor with an online portfolio that gives access to the content created during visits to At-Bristol. Visitors can create an Explore More account using a user name, password, and the barcode number from their science center ticket. In addition to visitor-generated content, Explore More provides access to exhibit information, online exhibits, and offline activity ideas to deepen the experience.

AN ANIMATED EXPERIENCE

Explore More has been used with particular success to extend the experience of the permanent exhibition Animate It! (animateit.org.uk), which opened to the public in 2007. At-Bristol worked in partnership with Aardman Animations to create the exhibition, which combines sets from the Wallace and Gromit animated short film A Matter of Loaf and Death with 25 interactive exhibits.

Within the exhibition, there are five animation stations providing opportunities to create stop motion films. We wanted to provide an intuitive interface that also included a number of the creative tools used by professional animators. The resulting interface design has a single button to start, with additional...
tools and buttons automatically added as the experience develops and the user gains confidence. Once they have completed their clips, visitors can save them or email them home.

Some visitors stop at this point and move on to other things, but others move to the edit station where they can join their clips together to form short movies. Titles, credits, and special effects are added as finishing touches to the mini-masterpieces, and again, the films can be emailed home. At home, users can continue to edit and improve their creations and share them with friends and family. They can also enter their movies in a quarterly competition with prizes for the best three in each age category. This layered approach draws the visitor in with options to leave the experience and continue later.

Since the initial development of the exhibition, we have begun to use this technology in school workshops. The web-based interface means no software to install, and teachers have a unique web page that provides access to the group’s work from the classroom.

The post-visit success of Animate It! certainly surprised our team, with over 80% of visitors accessing their movies from home. The personalization of the experience provides motivation to access and continue the experience of the exhibition.

RISING TO A NEW CHALLENGE
Our success in delivering engaging experiences within our venue and then extending the experience online has resulted in an opportunity to deliver a project with national reach linked to the London 2012 Olympic and Paralympic Games.

We are currently working to deliver part of the In the Zone outdoor traveling exhibition (www.getinthezone.org.uk) for the Wellcome Trust. The 3,200-square-foot (300-square-meter) exhibition will let visitors investigate how their bodies work during sports, activities, and rest. In the Zone, which is due to launch early this year, will be capable of providing an engaging, meaningful, and memorable experience for 2,500 people per
With such a large number of visitors, we are taking a new approach to the visitor experience at the actual exhibition, and the need for a personalized, online experience post-visit will become more important than ever.

Working with advisors from theme parks, theater, and television, we have created a linear experience that combines busking, theater, exhibits, video, and the web. Our theme park advisors have suggested that in high visitor flow situations, we need to prepare visitors so they know what’s next. Between each exhibit, a transition zone will orient visitors and provide an observation point. We will batch the visitors into groups of four as they make their way through the experience. This is very similar to a theme park ride and could not be further away from the open-ended experience we normally provide.

Post-visit, visitors will be able to view an animated report card of their experiences in the exhibition. For example, in one exhibit, visitors will perform a vertical jump, while a floor-mounted force plate measures the force of the jump and a high-speed camera captures a video. The resulting force trace and video can be uploaded to the Explore More portfolio. In addition, visitors will be able to upload an image of the vasculature in their arms, changes in their electrocardiogram and heart rate after exercise, and data on their reaction times and performance in a 10-meter sprint. Online activities and experiments will be blended with opportunities for social networking.

LESSONS LEARNED
So far, our efforts to create online post-visit experiences have been well received. Here are a few of the lessons we’ve learned:

- Don’t underestimate your audience, or you will limit the outcomes from the start. Support creative minds and embrace a variety of potential experiences.
- Keep the interface familiar and easy to use.
- Provide easily digested segments that encourage the visitor to continue further, but also provide obvious exit points. Not everyone is like one visitor who recently brought in his collection of LEGO characters to recreate the Star Wars series in Animate It!
- Use appropriate graphics and visual feedback to make the system accessible to younger visitors. Avoid text, use good design and contrast to help the controls stand out, and provide immediate responses to inputs. We have three-year-old kids creating some fantastic movies.
- Make sure you have sufficient time to Test, Change, Test, Change, and Test again.

As we continue to implement and refine Explore More, we are developing approaches that inspire creativity, deepen learning, increase contact time, and promote repeat visitation.

Dan Bird (Dan.Bird@at-brisol.org.uk) is exhibition director of At-Bristol, England, United Kingdom. As a current Noyce Leadership Fellow, he has chosen to focus on Explore More as his “strategic initiative,” supported by his sponsor, Goery Delacote, CEO of At-Bristol.
So-called “blockbuster” traveling exhibitions are increasingly prominent in museums and science centers. Because of their size, topics, presentation styles, and potential for revenue generation, they evoke discussion, questions, and (frequently) criticism.

This commentary offers observations on the concept of the blockbuster and some of its implications. It is based on research and tracking of blockbusters that my colleagues and I have conducted over the past two decades through the Washington, D.C.–based consulting firm Informal Learning Experiences (ILE, www.informallearning.com).

As manager of the Traveling Exhibits Database and publisher of frequent exhibition reviews and analyses in the Informal Learning Review, we talk to many vendors and visit many sites. We have also conducted several surveys of the recipients of both blockbuster and general traveling exhibitions, mostly in the United States and Canada. Since we are neither a vendor nor a venue and don’t charge for listing exhibitions on our website, we can be relatively neutral in our assessment of the industry.
DEFINITION OF BLOCKBUSTER
The best brief definition of a blockbuster I have seen is: “a popular, high profile exhibition on display for a limited period, that attracts the general public, who are prepared to both stand in line and pay a fee” (McLaughlin, 1998).

The blockbuster phenomenon in North America generally is traced back to 1976 with Treasures of Tutankhamun. That exhibition attracted some 8 million visitors to six U.S. art and science museums over a three-year period and produced enormous media attention as well as substantial sums of money. Since then, museums of all genres have been attempting to emulate those results.

While the blockbuster moniker is regularly used, it plays out very differently according to the host museum’s size, discipline, style, personality, and capabilities, as well as any local competition. An exhibition that plays as a blockbuster in a small-town museum in Colorado probably wouldn’t have the same impact in Chicago.

MOTIVATIONS FOR THE PHENOMENON
The primary motivation for blockbusters is financial. Revenue from admissions, memberships, sponsorships, grants, and sales is the driving force. But that monetary rationale is prominently coupled with the ability to provide a “once in a lifetime” experience with objects, specimens, and phenomena that are deemed important historically, scientifically, or artistically, and are often derivative of wildly popular movies and other media.

The blockbuster is a marketable event that dramatically raises the visibility of the museum. This, then, is expected to generate large public attendance; visits by new audiences (see table, opposite); purchases of new memberships; gift shop sales; and sponsorships and other support.

AUDIENCE RESPONSE
For the most part, when attendance (and occasionally revenue) data is made public, blockbuster exhibitions report having the desired impact. Gate attendance and memberships are above the norm, often very substantially. For example, the Museum of Science and Industry, Chicago, suggests a 20–40% attendance boost from a typical blockbuster. It is increasingly difficult to obtain actual data on the attendance at the true blockbusters (e.g., Harry Potter: The Exhibition, etc.) as a result of confidentiality agreements required by commercial vendors in particular.

Several museums that have had multiple versions of the Body Worlds exhibition have informally indicated that the second time around was not as well attended as the initial showing. And there is information indicating that memberships purchased in the glow of a true blockbuster (often strategies to move to the front of the line) are not renewed at the same rate as a more conventional membership. For example, 19 of 23 museums responding to a question on an ILE survey reported gaining a significant number of new memberships while hosting a major blockbuster. However, only 7 of 21 reported sustained membership growth after the exhibition.

A particular exhibition may perform differently at different venues. It is well understood that attendance fluctuates with the seasons; presentation of a blockbuster as a means to drive attendance during a normally slow time may increase attendance but to a lesser degree than it would at a more favorable time of year. And, of course, a museum located in a larger population center is very likely to attract a larger attendance than will the same exhibition presented in a smaller population center.

More important than the actual attendance is the largely nonmeasurable change in the expectations of the audience—both regular and blockbuster-inspired—for the museum’s
presentations in the future. There are indications (often seen online) that the museum’s less-dedicated audience expects this level of spectacle and excitement to be repeated regularly.

IMPACT ON FUNCTIONS AND OPERATIONS

Blockbusters have several impacts at the institutional level. On the positive side, the presentation of a blockbuster often causes (forces) an institution to modernize various procedures and learn new skills. These can include online ticket sales, use of timed tickets and services such as Ticketmaster, new strategies for crowd management, and development of new visitor amenities. Often the exhibition vendor will introduce the museum to new sorts of shop merchandise and advertising strategies. Also, depending on the museum’s collections (and the willingness of the vendor to allow it), museums can enhance the presentation with locally relevant materials and programming.

On the negative side, the surge in attendance and often extended public hours can place significant stress on the museum’s operations staff, including maintenance, security, housekeeping, and visitor services. There may be unanticipated costs for temporary staff and purchase of more supplies. There also may be unanticipated impacts on other areas of the museum, such as less attention to regular maintenance and cleaning of permanent galleries, greater pressures on cloakrooms and restrooms, etc.

FINANCIAL IMPACTS

Certainly, an institution with experience in presenting high-profile exhibitions has a better chance of meeting its financial goals than does one embarking on the effort for the first time. Of course, outside influences (e.g., severe winter weather) can create financial difficulties.

ILE’s surveys on this topic indicate mixed results. For instance, over half of 24 venues responding to a specific question indicated that insurance costs significantly exceeded expectations. On the whole, museums report that dedicated exhibition revenues cover approximately three-quarters of the actual cost of the exhibition. Thus, sponsors and outside funders are an important part of the financial calculation. The positive outcome is that the majority of museums hosting blockbusters show a net profit.

However, another aspect of blockbuster economics has to do with the vendor. Exhibition vendors may have requirements and calculations of their own. The location of the attendance “break points,” where museum/vendor revenue splits change, can impact the museum’s bottom line. In addition, though a blockbuster can make the museum more attractive as a rental facility and fundraising site, careful negotiation with the vendor is necessary to ensure a favorable outcome with the rental fees and fundraising revenues.

Over the last few decades, consortia of museums have come together to develop and share exhibitions. Thus, the funds raised stayed within the consortium. However, these exhibitions rarely have made it to even minor blockbuster status. The majority of the current array of blockbusters are developed and circulated by commercial vendors. In these very prominent cases, the funding for the exhibition leaves the museum “system” and is part of the for-profit organization’s revenues.

OUTCOMES

This commentary wraps up with a few observations about some varied outcomes of the blockbuster exhibition phenomenon.

• Audiences are being trained to always expect the next great thing to appear at their museum.
• Many blockbuster attendees are expressing their reactions on various social media sites (like TripAdvisor and Yelp). Thus informal reviews and comments are readily available—and totally

<table>
<thead>
<tr>
<th>Institution</th>
<th>No prior visit</th>
<th>Dedicated visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Science Center</td>
<td>37.0%</td>
<td>88.7%</td>
</tr>
<tr>
<td>Franklin Institute</td>
<td>13.5%</td>
<td>76.1%</td>
</tr>
<tr>
<td>Milwaukee Public Museum</td>
<td>32.4%</td>
<td>88.4%</td>
</tr>
</tbody>
</table>

This table shows the percentage of visitors attending museums during the run of the Mummies of the World who (a) had never visited before and (b) came specifically to see the blockbuster exhibition.
independent of museum editing and moderation. Many of these are effusive in their enjoyment of the exhibition, while others are caustic and critical.

- Because of commercialism (and sometimes divergence from the museum’s primary mission), attendees are changing from guests to customers. The museum may change from being a valued educational venue to an attraction.

- Mission dilution is an important concern. Museums go to considerable extremes to justify presentation of certain topics, especially those that are clear derivatives of popular culture. *(Harry Potter* is perhaps the current primary example of this, but several others can be similarly categorized). And museum audiences, particularly longtime members, are sensitive to this seeming diminution of the educational/intellectual responsibility of the museum. Comments to this effect appear on social media sites, too.

**CONCLUSION**

Blockbusters are with us now, and, I suspect, will be well into the future. The challenge to museums and science centers is to effectively meld the various aspects of the phenomenon—important financial benefits, public visibility and brand extension, integration of science with popular media, concerns about mission appropriateness, and the pressures of large audiences—in ways that are broadly beneficial to the museum and to its position in the community in the long term.

Robert (Mac) West (mleinc@informallearning.com) is the president of Informal Learning Experiences, Inc., Washington, D.C.

**REFERENCE**

The U.S. Institute of Museum and Library Services (IMLS) has selected five libraries and five museums to receive the 2011 National Medal for Museum and Library Service, the nation’s highest honor for museums and libraries. Two ASTC members are among the recipients:

- **EdVenture Children’s Museum**, Columbia, South Carolina, was honored for projects including the Big ED Health Initiative (a series of activities promoting healthy life skills) and the exhibitions *Body Detectives* (about chronic disease prevention), *World of Work* (about diverse jobs), and *EDDIE* (about the inside of the human body).

- **Madison Children’s Museum**, Wisconsin, was recognized for its community engagement. With a commitment to using only local people and products, the museum engaged some 15,000 citizens who donated money, time, and artwork. The museum also provides programs that enable families with limited means to visit often.

Six ASTC members have received Science Education Partnership Awards (SEPA) from the U.S. National Institutes of Health (NIH):

- **California Science Center**, Los Angeles: $217,049 to develop an exhibition in connection with the University of Southern California’s Virtual Sprouts: Web-Based Gardening Games project to teach nutrition and combat obesity.

- **Great Lakes Science Center**, Cleveland, Ohio: $1.25 million to partner with the Clinical Translational Science Collaborative at Case Western Reserve University to develop BioMedTech: Students Translating and Exploring Medicine (STEM). The project will introduce students and the public to research on the links between diabetes, obesity, and cardiovascular disease.

- **Museum of Science and Industry**, Chicago: $1.29 million for SIMLAB: Using Patient Simulation for Student Exploration of Community Health Issues, a collaboration with Chicago Public Schools. The museum will work with science teachers and health educators to develop customized applications for iStan (iStandard man), a Human Patient Simulator.

- **Oregon Museum of Science and Industry**, Portland: $1.14 million to develop *The Zoo in You: Exploring the Human Microbiome*, a 2,000-square-foot (190-square-meter) bilingual (English and Spanish) traveling exhibition.

- **Pacific Science Center**, Seattle: $1.2 million for Out of the Lab and Into the Spotlight (OLIS), which includes a Research Focus Gallery highlighting local research, an annual research festival, and monthly Science Cafés to help the public increase their understanding of current health information.

- **Yale Peabody Museum of Natural History**, New Haven, Connecticut: $1.32 million to improve communication between scientists and the public through high school curriculum units, museum exhibits, and public forums. Three infectious, vector-borne diseases—malaria, leishmaniasis, and dengue—will be used to illustrate the impact of climate on changes in epidemiological patterns.

Ray and Carole Neag have given $2 million to support renovations to the planetarium and to develop educational programs for children from disadvantaged backgrounds at the *Reading Public Museum* in Reading, Pennsylvania. The planetarium has been renamed the Neag Planetarium at the Reading Public Museum in honor of the donors. The renovations include interior work to establish a new *Space & Science Gallery*, a new roof and HVAC system, and other structural improvements.

On November 17, the U.S. Institute of Museum and Library Services (IMLS) and the John D. and Catherine T. MacArthur Foundation announced that three ASTC-member institutions—Oregon Museum of Science and Industry (OMSI), Portland; the *New York Hall of Science*, Queens; and the *Da Vinci Discovery Center of Science and Technology*, Allentown, Pennsylvania—were among the first 12 winners of a U.S.-wide competition to build 21st-century learning labs in museums and libraries around the country. The Learning Labs grant winners—four museums and eight libraries—will receive a total of $1.2 million. Four additional ASTC members—the *California Academy of Sciences*, San Francisco; COSI, Columbus, Ohio; *Institute for Learning Innovation*, Edgewater, Maryland; and *Science City at Union Station*, Kansas City, Missouri—will partner with awarded libraries in their communities.
Clarence Sirisena

Interviewed by Joelle Seligson

From collaborations to chopped-up mannequins, Clarence Sirisena, assistant chief executive in projects and exhibitions at Science Centre Singapore (SCS), finds innovative approaches to traveling exhibitions. His research on this topic—and his efforts to share knowledge with other science centers—earned him ASTC’s 2011 Roy L. Shafer Leading Edge Award for Experienced Leadership in the Field. Between his work at SCS and with institutions worldwide, Sirisena found time to discuss his discoveries.

What are key elements to making a traveling exhibition successful?
Try to get one that appeals to a wide range of audiences. Partnerships are also important, and marketing is critical. When [SCS hosted] CSI: The Experience, some younger staff said, “Let’s try to make something out of it.” We cut a mannequin up into parts, put them into plastic bags, dumped them in the lake, and got the media to cover it. They wrote this whole story: “Bags found with body parts inside. To learn more, visit CSI.”

Is this the kind of advice you’ve shared as a consultant to science centers in other countries, including India, China, and the Maldives?
I try to understand what the country, the people, are trying to do. Often one thinks that a model that works in your country can be transported to another country, and it’s not really the case. If you do not fully understand the people, you can end up with a big failure.

You’ve also worked with international colleagues as treasurer of the Asia Pacific Network of Science and Technology Centres (ASPAC) and as co-convener of the ASPAC exhibition group, helping to establish its annual meeting and set up an online traveling exhibition database. Why are such forums important?
It gives opportunities to share experiences and issues with setting up traveling exhibitions. People who work at science centers are very forthcoming and want to help each other out.

Currently we are working within the ASPAC network on an exhibition on rice. The Japanese make wine out of rice. People from Bali have rice for breakfast, lunch, tea, and dinner. There are many interesting stories, and stories are good in an exhibition. People like stories. That’s why movies never die.

You have plenty on your plate, yet you make time to talk with visitors. Why is that a priority?
In [SCS’s Science of Sound exhibition], I saw this family with a little girl. I demonstrated to her how to cup her hands to hear the echo [in the Echo Tube exhibit]. That look on her face—it really made my day. The exhibit initiated the learning experience. And it is important for staff to try to make these things happen as often as we can. Science centers are not just exhibits in a room; [they’re] all about people who love to talk to people and explain some of these beautiful things that happen all around us.

For a podcast and full transcript of this interview, visit www.astc.org/blog/category/astc-dimensions/q-and-a/.
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