Technology, we’re told, is anything created by humans in order to solve a problem, or to improve on something. That pretty much covers the entirety of human invention, from tables to zippers to clothes hangers, from computers to umbrellas to space shuttles, from wheels to toasters to emery boards to machine guns to coat racks… all of it is technology. What we do with that technology is, in most cases, up to us. Technology itself is neither good nor bad, it simply is. Of course, we’ve all encountered ‘bad’ technology, but someone, somewhere, decided that something needed improving on or fixing, and so we got that technology whether we wanted it or not.

The many uses of technology in both theatre and museums are perhaps not as apparent to the audience as they are to us, but exist they do, and if we encounter something that needs fixing or improving on, we either create the needed technology, or employ existing technology, sometimes in ways not intended by their creators.

From my perspective, I’m pleased that technology has moved us from candle footlights to LEDs. I’m happy to have the option to tell stories, share histories, and blow things up (I work in a science museum, remember) more efficiently, thanks to technology. We’d still do it, even if we didn’t have our current technologies, because the telling, the sharing, and even the blowing up are part of who we are. Technology is what you make of it. Use it to light the way.

- Douglas Coler
IMTAL President
As a manager of a budget for a museum theater program, when I hear the term “technology” or “high-tech” in reference to theatre, I usually see lots of dollar signs. Lasers, lights, and screens, oh boy! In some cases this is true and often a great solution to a storytelling puzzle. However, as we read in the articles in this quarter’s issue on the theme The Future is Now: Tech in Museum Theatre, technology can refer to any number of tools, devices, or mechanisms to enhance the storytelling. The definition of “technology” from Merriam Webster is “a capability given by the practical application of knowledge.” As someone who works in a museum where science is practiced, I love this definition. We apply a knowledge to give our shows the capability to connect people to the story in a way that perhaps the human form cannot do alone. We create puppets large and small to explore extinct animals, we construct beautiful backdrops that give a sense of place, we use the video game as a frame to create a conversation about current events. The technology is ultimately there to serve the story. Used in a thoughtful way, it is technology that can connect the line between our story and our audience’s imagination.

I hope you enjoy reading more about how three very different museums (Children’s, Natural History and a Zoo) have incorporated the use of technology in their shows. What are the common problem-solving strategies involved around budget, staffing, and implementation, as well as the creative uses of the device or mechanism itself? I hope you learn something new and gain inspiration for taking your own museum theatre productions to possibly a new technologically-enhanced place.

- Ilana Gustafson
IMTAL Publications Officer
Museum theater professionals get the most interesting of requests and our Kohl’s Wild Theater program from the Zoological Society of Milwaukee is no exception. In 2013, we were asked to develop a STEM-based theatrical program for middle school audiences that would feature our zoo’s fieldwork in the Democratic Republic of the Congo. In 2016, we were asked to make a show about the solar system; a strange request when you consider that we are a very earth-oriented institution. But, being the museum creative types that we are, we didn’t shy away from these challenges. In fact, these two projects had a lot in common because they used audio-visual technologies to enhance storytelling in ways that would otherwise be impossible. Before I jump into the technological journeys, I need to state clearly that technological gizmos are not required for great storytelling. In fact, I almost always prefer the creative use of simple objects to encourage active participation and imagination from the audience. But sometimes imagination might not be enough, or even worse, could do a disservice to the message you are trying to share. My best example is the show about fieldwork in the Congo — The Congo Code. Our institution is a leader in bonobo conservation and does extraordinary work to study and protect the species in their natural habitat. The reality is that bonobos are the rarest of the great apes due to intense poaching. Letting young audiences imagine the risks associated with that part of the world could result in legitimate fear or concern that would disengage the audience. How do you teach about life-threatening violence in an age-appropriate way? Our creative hook was gaming. We researched stories such as Jumanji and The Hunger Games. We learned about the use of video games in traditional education. We considered violence in video games and what would be age appropriate for a middle school audience. As an artistic team, it was decided early on that a video game would provide the
best world to safely navigate the real-life threat of poaching that our conservationists experience in the field. To achieve this effect, we knew that we couldn’t rely on simple props alone. Instead, we created a 7-foot screen with a rear projector that served as the majority of the set. The audience’s imaginations were still in charge as we led them to believe that we were in a gaming space. We still used simple objects such as pixilated icons that were operated by puppeteers. In fact, the bonobo in the story was portrayed by two puppeteers with pixilated costumes to represent their involvement in the game. But the inclusion of technology gave us control of the world. We used live cameras to differentiate between real-life and the game. One character of the show was grounded in the real world and projected into the video game screen. Others were live actors playing characters as functions of the game. Using cameras, projections, and sound to express the world of the play made a complicated subject accessible. At the end of the show, we led a talk-back with the audience that included the real video footage of our conservation teams in the Democratic Republic of the Congo. Audiences could see the real-life version of the game on stage, a presentation that would be otherwise impossible without investment in technology.

Flash forward a few years to our challenge of going into space. The first question to answer was how to tie space curriculum to our institutional mission of conservation. The solution was to examine Earth’s unique capacity to support life in comparison to the other planets. After a few failed script drafts, we realized that we needed to travel to all of the planets. Otherwise, we would only talk about space which would get very boring very fast. To solve this problem, we drew upon the technologies we developed from producing *The Congo Code*. The key elements were a rear projector and a live camera. But this time, it wasn’t an all-inclusive screen defining the world of the play. In this new show, the projections served as a large computer monitor on the control deck of an imaginary spaceship. With the use of projections, we could show images of what the spaceship was passing. We could pull up images of Earth and animals featured in the show. We even made the computer into a character that could interact with the actors on stage. The result was our show, *The Monarch: A Space Adventure*. With the use of simple technologies, we could expand the imaginary journey to experiences that would otherwise seem juvenile.

The technologies we employed in 2014 and 2018 were the same, but the way we managed those assets changed greatly between the two shows. First and foremost, we learned that to successfully use this technology, you need staff support to manage it. The more gadgets and gizmos you add, the more possibility that something could go wrong. If you only have your acting team on hand to resolve the issues, the entire
experience can be disrupted. We now operate all of our shows with a stage manager who is trained to troubleshoot malfunctions during a performance. Secondarily, you need a partner that has a great understanding of the technology and the ability to adapt it to your needs. Museum Theater, by its nature, has to be adaptable to non-traditional spaces. To make technology work in that regard, there needs to be a developmental process to work out bugs. Many of our technological accomplishments have been possible through a collaboration with Chris Guse, a professor at the University of Wisconsin-Milwaukee, who specializes in audio-visual technologies in theater. We have been able to utilize Chris’s expertise in development, implementation, and post-launch to deal with technical issues at every phase.

At the end of the day, the goal is to tell a compelling story that delivers a clear message to the audience about your institution’s mission. If used correctly and with specific intent, technology can bolster Museum Theater’s potential. For us, technology opened opportunities to dive into surreal worlds of our imagination and launch us into outer space. But if we didn’t have the support mechanisms to adapt and maintain the technology, the entire operation could be derailed and would defeat the point of doing theater in the first place. With the right mix of imagination, creativity, and technical expertise – anything is possible.

“Museum Theater, by its nature, has to be adaptable to non-traditional spaces. To make technology work in that regard, there needs to be a developmental process to work out bugs.”

ABOUT THE AUTHOR:

Dave McLellan currently directs Kohl’s Wild Theater, a program from the Zoological Society of Milwaukee in partnership with Kohl’s Cares. Since 2011, Kohl’s Wild Theater has produced over 22 original plays and musicals to be performed at the Milwaukee County Zoo and on tour throughout Southeast Wisconsin. In June of 2018, Dave will transition to become the Director of Guest Experience for the EarlyWorks Family of Museums in Huntsville, AL.

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During each new training class for incoming interpreters, Josh Estes, STEM & SPX Galleries Interpretation Manager, likes to tell our new hires that every day, we are hosting an amazing party for our guests. He is right. During our guests’ stay with us, we will use every trick in our arsenal to educate, amuse, delight, stimulate, reveal, spark, grow, and engage them, regardless of age. We are called a Children’s Museum, but we are actually a Families’ Museum. Our exhibits and programs are designed purposefully to engage the entire age spectrum, from toddlers to seniors. We also recognize that there are more and more choices for families to spend their recreational and educational dollars on, so the responsibility is on us to provide experiences that they won’t find anywhere else. Experiences that they want to see over and over again. Experiences that turn them on to ideas they hadn’t considered before – and all of it presented in the highest quality, most engaging formats possible. That’s why we give so much attention to the technical aspects of our museum theatre.

The Interpretation department at TCM is fortunate to have great institutional support at the highest level, and we are fortunate that we are usually provided resources to execute our assignments. But we also realize that bigger is not always better, and that the right tool for the job is crucial to success. We create museum theatre at several levels, depending on different factors including content, performance area, family learning goals, and run time of the exhibit. The technical requirements vary, but we take all of these factors into consideration to make sure that the small programs are supported in a way that allows us to deploy other resources for larger scale productions. Some of our shows are designed to attract guests to the museum or to a specific exhibit, some are designed to elaborate on themes presented in the galleries, and some are designed to explore related content that floor space or label limits restrict.

Like most institutions, many of our programs are built on formulas that have been time-tested for success. Occasionally, we have the opportunity to look for new solutions to technical challenges. What I hope to do is share some recent programs of varying technical sophistication, which I hope will serve as a springboard of ideas for both seasoned and brand new practitioners of Museum Theatre.

One of the most moving sets of programs we have offered is *My Story*, the three character monologues that were presented in our National Geographic Sacred Journeys exhibit which opened in 2015. We developed three composite...
characters, and each one shared their particular story about a pilgrimage that had life changing impacts. One of the simplest formats, a character monologue, did not require heavy technical requirements, but we wanted these simple, powerful stories to shine, so the appropriate tech elements for these were as follows:

1. Track lights focused directly onto the playing area
2. Costumes that were appropriate, but not eye-catching
3. Small images on easels for reference
4. One large backdrop for each piece, in this case a vinyl curtain hung on a rod that could be pulled out for shows or tucked behind a wall when not needed.

Of these four elements, the standout “wow” was the backdrops. We chose vivid, dramatic representations of the Western Wall, the Labyrinth of Chartes Cathedral, and bright red Torii Gates. They grounded the pieces visually, and gave the actors a large visual to refer to, but as important and successful they can’t see the performer’s eyes, they are less likely to connect with the character and the story. In addition, the space usually needs more light than initially we might think. There is a reason spotlights are effective. They focus the eye where the action is. Sometimes, just a small bump in area lighting is enough, particularly in a space not designed for performance, to guide our eyes to the performer, which makes their jobs just a little bit easier. In this image, notice how sharply the sides and top of the space recede into darkness of this multipurpose room. This particular actor is extremely tall, so we were pushing the boundaries of keeping his face lit, but he and the other five actors who performed these monologues were seen clearly, so they could deliver their compelling stories to receptive audiences of all ages.

“Good directors and designers know that if an audience can’t see you, they can’t hear you. If they can’t see the performer’s eyes, they are less likely to connect with the character and the story.”

Our large-scale programs take place in our large, open Sunburst Atrium. This atrium connects our welcome center, food court, museum store, and Dinosphere exhibit, and is the central hub of the museum. In the last six years, it has also gradually evolved into a performance venue for audiences of 10-500. One selling point of the museum to members is that we are always changing and developing new experiences. That means that we are also expected to develop new Atrium Shows, which requires increasing ingenuity and resourcefulness from my team, as we have forced this space to mature in its technical capacities far beyond those for which it was designed.

In many ways, our newest Atrium Show, Sports Legends Spectacular! is one of the smallest of these programs. The goal of this short, seven-minute pep rally is to get our guests pumped up to go outdoors and explore our new 7.5 acre, three-gallery expansion, Riley Children’s Health Sports Legends Experience. This is our shortest Atrium Show, and uses one actor as
a cheerleader. We use two staff as “backstage techs” to run the music and to coach the families, as there are seven audience participation moments written into the script. The technical elements for this production are:

1. Intelligent lights programmed to provide a ballyhoo effect
2. Recorded voice and music throughout the piece
3. Lighting to brighten the stage area
4. Split background banner for the audience “rookies” to burst through
5. Fog machine
6. Oversized prop trading cards and jerseys for audience recruits
7. Clipboard for recording “rookie” names for announcements
8. Cheerleader costume, pompoms, and cheer flag

One of the aspects we consider when selecting equipment for a show is whether we will be able to reuse that same equipment for other programs, which saves money in the long run. A few years ago, we created a fairytale Atrium Show, and because of large hats, wigs, and set placement, the actors’ faces were always in the shadows. My team was able to work to hang two lights that had the effect of warming the actors’ faces just a bit, so they could be better seen. The Sunburst Atrium is a large, open space, and when the sun is bright, it isn’t always a noticeable difference, but on overcast days, it makes a world of difference. A bit of an investment for a subtle, but crucial result. Those lights are now a part of all the Atrium Shows, as they bump up the quality in a subtle, but meaningful way. We have used fog machines in several of our Atrium Shows, in our DIY Circus gallery program, and our theatre, so our investment in those units has paid off many times over. The intelligent lights were the major new addition for this show, but after this show finishes its run, if we don’t need them for the next one, they will be moved to the theatre, where we use intelligent lights in almost every production.

When the Children’s Museum of Indianapolis featured the Terra Cotta Warriors in 2014, we were tasked to create an experience that would encourage attendance and also spark the curiosity of our young guests to want to learn more about these ancient wonders. We had great success with bringing the fossils of our juvenile T. rex, Bucky, to life, so we sought to do the same with one of the warriors. We knew that we needed a higher-quality costume than we could produce in house, or that was available commercially, so we partnered with the costume design faculty and students at Butler University. The class worked from their professor’s design to build and paint an amazing costume that continues to surprise and delight audiences each time we present this magical program. In the picture to the left, a child looks at a replica of a Terra Cotta Warrior. In the picture above, you see our archaeologist, “Dr. Schloss,” with our version of the standing warrior at a local television station. Butler did a pretty good job, don’t you think?

This show is the most content-heavy of all our large shows, so to get across all the points, the following...
tech elements were used:

1. Vinyl backdrop
2. Customized “crate” with hand truck containing colored lighting
3. Replica weapons: sword, crossbow, spear
4. Large photo close-up of statue with paint
5. Lab coat costumes for actor and child assistants
6. Camera with flashbulb
7. Clipboard and pencil
8. “Jade tablet” prop with embedded LED lighting
9. “Jade tablet fragment” for audience plant
10. Recorded music

We were fortunate to be able to take advantage of some staff creativity for this project, as our Interpretation Operations Manager, Johnny Marquis, had excellent ideas about building the tablet, embedding lights in it, and constructing the crate and adding the lighting. He was able to fabricate the tablet out of foam and LED lights, and was able to work with our in-house production team to build the crate. This show provides six opportunities for audience participation, covers at least five content-points, and still provides surprises, laughter, and WOW moments to audiences. One of the best parts of this project has been that even though the Warriors have long since marched on, this content still connects directly to the subject matter in our archaeology gallery, so we continue to be able to offer this show for years to come.

The simplest programs require an actor, and audience, and a place to present. Assuming the actor can be seen and heard sufficiently, that is all that is needed. Many museums, including the Children’s Museum of Indianapolis, present simple, effective programs using little more than these essentials. But, as exhibitions, audiences, and expectations evolve, those of us who create museum theatre have an obligation to meet and exceed those expectations. This is not to say that large budgets and resources are requirements for compelling theatre, but rather a reminder that the consideration of the most basic technical elements, sound and light, can enhance a good presentation, which can ignite a spark of curiosity in the audience...

…”consideration of the most basic technical elements, sound and light, can enhance a good presentation, which can ignite a spark of curiosity in the audience…”

ABOUT THE AUTHOR:

Todd D. Norris is the Associate Vice President of Interpretation and Family Programs for the Children’s Museum of Indianapolis. Prior to moving to Indiana in 2013, Todd held several positions at The Colonial Williamsburg Foundation including Training Specialist, Manager of Evening Programs and Performing Arts, and Senior Manager of Performance Interpretation. In addition to his administrative duties at both institutions, he has written, directed, produced and performed many programs and plays for them. Todd has an MFA in Acting from the University of Louisville and a BA in Theatre Performance from The University of Findlay. He has taught and directed at several schools including The College of William and Mary, Christopher Newport University, Alice Lloyd College and Wright State University. He is an associate member of the theatrical union, Stage Directors and Choreographers Society, and continues to work as a freelance director. He is also an avid amateur musician, having performed at the Sydney Opera House in Sydney, Australia and with the MasterWorks Chorale of the Louisville Orchestra. Todd is currently the Vice President of IMTAL.
A group of children recite lines from the *Book of Going Forth by Day* (commonly known as *The Egyptian Book of the Dead*), they hope to guide the shadow puppet of a recently deceased woman through the trial of having her heart weighed on the scales against the feather of truth. Occasionally she passes the test unscathed.

A collective scream surges through a small theater as an adult *Smilodon fatalis* roars. The host is surrounded by the audience at the performance’s conclusion.

A timid hand rises to meet the snout of a juvenile *Tyrannosaurus rex*. Expressions of pride, terror, and curiosity flash rapidly across their face.

A crank is turned for the first time, bringing life to a series of levers, which in turn animate the wings of a miniature pterosaur. The newly minted mechanical engineer responsible is ten years old.

An anthropomorphic Mountain Lion sits for an interview with an advocate of Community Science.

Is the Community Scientist flirting with our feline representative? Surely not…

Every week the staff of the NHMLA (Natural History Museum of Los Angeles County) Performing Arts Program use puppetry and its associated arts as a means with which to explore the museum’s collections and touring exhibitions. The Performing Arts Program began in 2008 as a temporary measure intended as a stopgap during the renovation of our Dinosaur Hall. We began with two life sized juvenile dinosaur puppets (typically referred to as “full-suit puppets”) built by the skilled fabricators of the Australia-based creature effects and performance company, Erth, in collaboration with museum Paleontologists. It soon became apparent that these programs offered an irreplaceable guest experience. In light of this, the program was not dissolved following the Dinosaur Hall’s completion but was instead expanded. In the years since our formation, we have diversified our programming both in subject and medium. Current programs run the gamut of puppet-related disciplines: animatronics, toy theater, shadow theater, digital animation, rod puppetry, mask theater, and automata have all been used as means of interpreting museum exhibits. Our collaboration and subject matter have grown in scope as well. In addition to our work focused on dinosaurs, we have developed performance experiences that interpret biomechanics, community science, Egyptology, marine biology, living history, and Pleistocene paleontology.
As our subject matter, medium, and audience has expanded, so too has our interest in exploring those tools and techniques that might be added to our repertoire. We now use professional lighting, sound, and projection equipment for our performances. These technologies assist us in creating a strong context for the work we create, but for the purposes of this article I’d like to focus on the technology as it relates to the mechanisms and methodologies of our specific puppetry practice.

Puppetry is an old art form with roots in early animistic traditions. Over the millennia it has served as a vehicle for worship, popular entertainment, fine art, and political subversion. The 17th and 18th century playwright, Chikamatsu Monzaemon wrote highly regarded dramas for the bunraku puppet theater, the mechanisms of which continue to inspire roboticists to this day. In the 1920’s Lotte Reiniger would adapt shadow puppets for film, creating the first animated feature film and setting the stage for the animated films of Walt Disney. In the 1980’s puppetry would become a fundamental contributor to pre-digital special effects. Many of the current generation of military remote-controlled robots use interface systems adapted from those systems originally used to manipulate animatronic puppets. The methods and mechanisms of puppetry are as varied as the cultures from which they were born. It is, at its heart, an art of crafting the illusion of physiology and physics. A puppet show may seek to animate the movement of planetary bodies with equal efficacy as it might animate a cat. With this history in mind I think puppetry serves as a useful, if simplistic, means of viewing the evolution of technology. With puppets as with industry, the promise of new technology is usually a promise of old technological innovations reimagined or recontextualized, miniaturized or enlarged. The puppets we use at NHMLA are no different. The steel cables that run the length of our animatronic smilodon fatalis are simply a lateral counterpart of the strings of a marionette. The sound system that gives our tyrannosaurus its growl is built of a car stereo and a guitar effects pedal. The mechanical components and systems that allow our triceratops to emulate the movement of a quadrupedal animal were harvested from bicycles and orthopedic forearm crutches. It is my belief that at nearly any moment the technological solution to a problem exists somewhere in the world as a tool or component designed for an entirely unrelated objective.

ABOUT THE AUTHOR:

Eli Presser is a Chicago-born puppeteer living in Los Angeles. He began his study of puppetry under the mentorship of Redmoon Theater and Michael Montenegro in 1996, completing his formal studies with Janie Geiser at the Cotsen Center of Puppetry Arts. Over the course of Eli’s career, he has had the privilege of working alongside a variety of prominent artists including Norah Jones, Kanye West, Joey Arias, Richard Foreman, John C. Reilly, and Bill Viola. His most recent contributions to puppetry have been as co-writer and director of “Kafka in Wonderland” with half past selbur schuldand as lead puppeteer on “The Mill at Calder’s End”, conceived and directed by Kevin Mcturk. In his current role as Technical Coordinator for the Natural History Museum of Los Angeles County’s Performing Arts Program, Eli continues to work towards the creation of performances that fulfill the public’s need for artistry, education, and inspiration.
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