



Great Gigs for Great People

By: Richard Cadena

I got into the entertainment industry in 1986, during the Stone Age of entertainment. It was not long after the rock band Genesis toured with the very first commercially available automated light, the VL1. (Maybe it was 1986. It just seems like 1986 because MTV still played music at the time, and it was before the Internet, the Kardashians, iPhones, HDMI, One Direction, USB, giga-anything, HD, and even before the blue LED.) All that history gives you a better perspective on where the industry is going in terms of hardware, software, and wetware (the soft, wet tissue between your ears), and I think the demand for people with video skills will grow over the next few years.

The 1980s and '90s was an exciting time to be in the lighting industry. That was when moving lights were a novelty, and you could wow a crowd with a handful of automated lights, some flash and trash, and a little programming. Today, video is the new automated lighting and it's driving a new renaissance in live entertainment. Video is more dynamic, versatile, and has far fewer limitations than automated lighting, and as the hardware becomes more powerful, cheaper, and easier to use, it's becoming easier for anyone to create amazing video content.

The computer industry has been the real driver behind entertainment technology since the advent of the computer-



A scene from *Nierka*, written by Tupac Martir (music composed and performed by Austin TV and NSM PSM, choreography by Fernando Hernando Magadan).

All photos: Alex Sufit



Tupac Martir.

controlled lighting system. (See <http://www3.northern.edu/wild/litedes/lid10.htm>.) A lot of the development in video hardware now trickles down from the gaming industry, and that has helped to produce media servers, visualizers, and effects engines with amazing capabilities. Graphics cards are now basically very powerful computers with chips that are as powerful as the main CPU, allowing them to paint amazing graphics and render huge files in real time. And computers are so powerful now that a relatively inexpensive machine can run very powerful software, like 3DS Max, Maya, Cinema 4D, Blender, Poser, Photoshop, After Effects, Final Cut Pro, etc. As a result, video content development is on an exponential development curve, and power users with these skills are in demand.

Technology is moving ahead at an incredible rate but it can't continue at the same pace indefinitely. Moore's law (computers double in power every couple of years while dropping in price) will eventually be repealed, and hardware development will slow its blistering pace. There is also a shift away from desktop machines and lap-

tops to tablets and handhelds, which is having the effect of slowing research and development of more powerful microprocessors in favor of, say, the smaller and more efficient ARM processors used in smartphones and tablets. Economies of scale are changing, and the prices of graphics processing machines are starting to defy gravity. Soon the industry will have to rely more on software and wetware developments to propel the video renaissance. There's already precedent for that.

As hardware engineers push the boundaries of the technology, software engineers have to work harder to keep up. Ultra-high-definition (UHD) televisions, for example, are now available, but the problem of how best to deliver UHD content remains. One frame of UHD has 8.3 megapixels (3,840 pixels wide by 2,160 pixels high), which is a huge amount of data. Even without increasing the color space, frame rate, or bit depth, that's still four times as much data as HDTV. When it's all said and done, chances are that we will end up with a larger color space, higher frame rate, and more bit depth, all of which make it even more challeng-

ing to process and deliver UHD (and beyond) video content.

One response to this challenge is to develop better codecs, like H265 or "HEVC" (high-efficiency video codec), which is about 30% to 50% more efficient per byte than its predecessor, H264. Just by

applying better logic to the same hardware, it reduces the amount of data that is needed to transfer video content with a reasonable amount of loss. It can reproduce images at the decoding end with very good results. HEVC is so efficient that it removes a lot more data than it keeps in the transfer process. The compression ratio is about 100 to 1, which is really astonishing.

As good as it is, it's still not enough bandwidth to handle the most demanding UHD protocols, and the search for better codecs continues. There are many other codecs and intermediate compression formats, some of which are proprietary, some are open source, and some are industry consensus standards, in search of better data throughput. There is always a lot of development in this area and it will continue to move forward at a quick pace as long as there are software engineers to push the boundaries.

Hardware and software will continue to evolve, but the developments that will have the biggest impact will be the clever use of existing technology. Last year, I saw Cirque du Soleil's show *Michael Jackson ONE* in Las Vegas, which is a great example of

cutting-edge video content. It brings a lot to the show, almost to the point where it is a co-headliner. The video extends the stage to almost 180° because of the way it spills onto the walls, and it seemingly engulfs the audience. It creates a strong feeling of immersion in a way that lighting alone can't do. One of the highlights of the show is the "resurrection" of Michael Jackson via video. It's a Pepper's ghost effect, but it has the look of a three-dimensional projection from the audience. It creates a very strong illusion of the presence of Michael Jackson, and it changes the entire feel of the show.

Although it's not a true hologram, which is the holy grail of the entertainment industry, it is spectacular. Even if holography is not achieved in my lifetime, what will be achieved is higher resolution, more color depth, and higher frame rates, all of which have the effect of creating some stunningly realistic-looking video. Most movies are now shot in 8K resolution and edited down to 4K. As new technologies are

introduced in broadcast, movie production, and home theatres, the entertainment industry will benefit from it, and techs who understand it will always have a gig.

One of the next frontiers in entertainment is the integration of video and automation. A great example of this is Tupac Martir's 2011 show, *Nierka*. In it, he used CAST Software's BlackBox to track video screens across the stage as they were moved and rotated by dancers. As the screens rotated, the media servers adjusted the projection to fit exactly on the projection surface down to a single vertical line. It was an amazing demonstration of how video and automation can work together. (To see another example of the integration of video and automation, visit <https://vimeo.com/52198789> and <http://bit.ly/botdolly>.) These applications will provide jobs for a variety of disciplines like robotics and video techs, riggers, programmers, content developers, network techs, and more.

The industry is maturing, and it's bringing the art of video content devel-

opment along with it. In the early days of the Renaissance, people would spontaneously show up under the cover of darkness and create an impromptu projection on the side of buildings using nothing more than a couple of projectors and a Matrox DualHead2Go or a TripleHead2Go. Today, these drive-by projections offer such an appeal that they have morphed into full-blown mapping festivals over the world. (See www.mappingfestival.com, <http://nyfol.org/>, www.dallasaurora.com, www.montrealenlumiere.com, <http://www.brasbasahbugis.sg/SNFPortal/>, etc.) They blend the art of content creation with the science of lighting and projection, and in the process, they provide gigs for creative and imaginative artists.

All of this is leading to continuing demand for artists, software and hardware engineers, programmers, techs, and creative people who love working with video. In other words, there are gigs for people like you. 📡