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ComputerGraphics

WORLD

November 2005 www.cgw.com

Disney's coop d'etat

The studio invades
the 3D space with
backing from its
traditional forces

Out of this World
*Zathura takes viewers
to Saturn...and beyond*

Bit Parts
*Giving Halo's game
characters new roles*

McMotion
*New mocap approach
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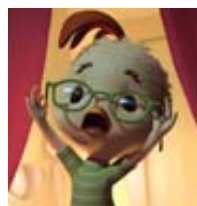
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Web story exclusives:

Self-Promotion for the Digital Artist

You've got the talent and an arsenal of CG tools, so why isn't the phone ringing? Find out what you can do to overcome this problem in this first article of a series designed to help CG artists get noticed.

Daz Studio: Free for All

A firsthand look at Daz Productions' new (and free) Daz Studio 3D figure posing and animation software for the Mac and Windows platforms.

From Film to Television

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Letting the Work Flow

SGI's InfiniteStorage system helps Capital FX tackle its DI work load.

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Disney proves it's no featherweight in CG feature production by pushing the limits of 3D animation in *Chicken Little*. See pg. 12.



@ See www.cgw.com for a more in-depth version of this article.



Kelly Dove
Editor-in-Chief

Timing is Everything

"Autodesk is acquiring Alias." On October 4, at approximately 5:30 EST, those four words struck fear in the hearts of the creative community. Phones rang, forum postings appeared, and text messages emerged—all spreading the news: Autodesk and Alias will become one.

As the excitement perpetuated across the ether, my plane was landing in, of all places, Toronto, where I was preparing to meet with Alias for what I believed to be a late-afternoon get-together. Completely oblivious to the breaking news, I approached Alias's headquarters, casually noting a handful of employees with slightly stunned looks on their faces. "Long day for them," I thought, and went inside. A few minutes later, I had the look, too.

Shortly thereafter, I found myself jumping into a cab to meet with Doug Walker, president of Alias, and Martin Vann, vice president of Autodesk Media and Entertainment, to discuss the news of the day: Autodesk's acquisition of Alias.

"Our DNA is the same," says Walker. "We have a huge investment in complimentary 3D solutions. It's a natural, logical match." However logical it may seem to Autodesk and Alias, there has been an outpouring of concern within the creative community as to how this union will impact production pipelines, both large and small. Are Alias's products going to be absorbed into Autodesk's offerings? Will product development, training, and customer support suffer? Are product road maps going to change? Is research and development going to be affected?

Autodesk holds firm that the acquisition of Alias and its assets will not affect either company's existing products or customers. It also states, after the sale is finalized, it will continue to focus on creating a suite of software and services that complement each other. While the discontinuation of products or brands is not currently planned, Autodesk did say that, eventually, the markets they both serve will converge. "We are uniquely positioned to drive the convergence of design and entertainment," says Vann, stating that studios at the forefront of the convergence are already repurposing their 2D and 3D design assets across the design and effects industries, which is convenient and cost-effective.

The ace in the hole for this convergence is the FBX file format, which Alias acquired last year in its purchase of Kaydara. FBX plays an integral part in next-gen interoperability as assets are exchanged across disciplines, which Autodesk believes, will become more commonplace as companies repurpose assets for marketing, manufacturing, branding, product development, and advertising. "Our customers tell stories," says Walker. "And storytelling will evolve into a much larger process." One example involves using a manufacturing model, such as a truck or car, bringing it into a game engine to see how the vehicle interacts within the environment, using it for branding and advertising within the game, and exporting it for use in feature-film effects or broadcast advertising. Both Vann and Walker believe the FBX file format will become the transport layer that helps make this type of scenario a reality.

"We are competitive and complimentary," says Walker. "Alias's strong design business fits nicely for Autodesk's customers in the automotive, film, and design pipelines. Our customers will help fuel the growth between the two companies." ■

Autodesk
announces plans
to acquire
Autodesk and
looks toward
the future

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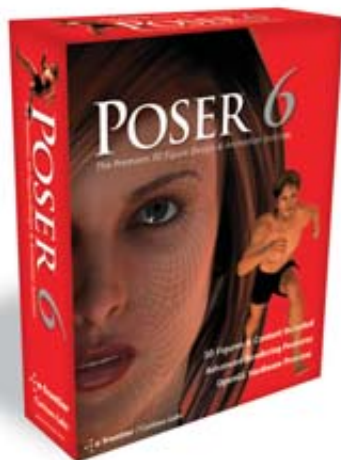
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HD DISPLAY

PRODUCTS

Identical Color in HD

Ecinema Systems has recently introduced the DCM23 reference-grade, color calibrated high-definition LCD monitor for HD and digital intermediate workflow. Enabling color grading and picture evaluation with color-matched viewing within a facility, across facilities, or on set, the monitor uses TFT (thin film transistor liquid crystal display) LCD technology with custom

optics to deliver true video frame rates at native 1920x1080 HD resolution. The monitor offers virtually identical color fidelity across all DCM23



monitors and features the Surround Lighting System (SLS) template, which the company claims produces an optimal viewing environment out of the box. Pricing begins at \$16,500.

COLOR GRADING

PRODUCTS

3D Additive Included

FilmLight has upgraded its Baselight color-grading system with new creative tools, support for the Baselight Blackboard controller, and a four- or eight-cluster architecture built on the new AMD Opteron 880 processors. Slated for release by year end, Baselight V3 includes a new 3D additive and subtractive keyer for isolating areas in different parts of the color space for management within the same matte strip. The system also offers improved audio support for scratch audio and field rendering, and 3:2 pull-down for video grading and deliverables. Other new features include a scene detector to break down long-form content into separate shots for easier grading, grain reduction, OpenFX plug-in support, and more. Baselight V3 system pricing begins at \$145,000, and the Baselight Blackboard pricing starts at \$48,000.



COLOR GRADING

PRODUCTS

Da Vinci Resolves Digital Mastering

At IBC2005, Da Vinci introduced three distinct hardware configurations and a new PowerGrid acceleration platform for its Resolve digital mastering suites. The new offerings—Resolve FX, Resolve DI, and Resolve RT—are designed to address

specific needs in the postproduction pipeline. Resolve FX, the base-level solution, targets budget-minded studios performing file-based, nonlinear color enhancement, conforming, processing, and clip matching in a digital intermediate workflow. The Resolve FX solution includes Da Vinci's PowerPlant image processing accelerator, which was introduced earlier this year, and is designed for companies that do not need real-time color enhancement in their workflow.

The Resolve DI system is built for digital intermediate projects such as

color-look creations and conforming work, which may not require real-time throughput. The system also includes PowerGrid2, a pair of PowerPlant accelerator boards designed to increase the system's speed and performance.

The most flexible of the three systems is Resolve RT, offering true real-time image processing in film, DI, and video finishing using PowerGrid3, a combination of three PowerPlant accelerators.

Resolve FX and Resolve DI are expected to ship by the end of 2005, and Resolve RT is now available.



64-BIT

PRODUCTS

Dual Core Battles On

Earlier this year, AMD challenged Intel to a dual-core duel—a live, public battle pitting the two companies' comparable dual-core processor platforms against each other. Although the challenge has yet to materialize, the threat of an impending duel hasn't crimped the forward flow of dual-core technology.

AMD keeps powering ahead with its dual-core offerings, recently announcing a new AMD Opteron 880 processor for eight-way and 16-core servers and the Opteron 280 processor for workstations. Many system manufacturers simultaneously pledged their support, with Hewlett Packard, Boxx, and Western Scientific being some of the first to announce new products.

But perhaps the company with the

quickest integration of the new AMD Opteron processors into a studio workflow is HP—the company integrated more than 1000 HP xw9300 workstations with AMD Opteron 280 processors into the video games and animation pipeline at Lucasfilm well in advance of the product announcement. HP states its xw9300 series of workstations are built for flexibility in the production pipeline and include support for dual PCI-Express 16x graphics and up to four dual-core processors onboard.

Boxx Technologies's 7000 series of 3DBoxx workstations and RenderBoxx render nodes, also support the recent



AMD Opteron 280 processors. With a choice of Nvidia

nForce Professional 2050 or 2200 GPUs with SLI, Boxx's implementation of dual PCIe 16x delivers elevated graphics performance for animation, compositing, and rendering.

Western Scientific's workstation and server offerings cut across the entire entertainment community, utilizing AMD Opteron 880 and 280 processors in a variety of solutions—from DI systems to servers. Its Opteron-based product family includes the TeraBlade and KiloCluster high-performance computing clusters, the FusionA64, FusionA8, and Fusion2K rackmounted or desk-side servers, and the FusionSA disk storage.

DI WORK FLOW

PRODUCTS

Quantel Unleashes Pablo

IBC2005 attendees were among the first to witness The Pablo Suite, Quantel's latest advancement in color correction technology. Designed by colorists, The Pablo Suite consists of three models—the iQ2 Pablo Suite for HD applications, the iQ2 Pablo Suite for 2K digital intermediates, and the iQ4 Pablo Suite for up to 4K DI work.

Also making its debut was Quantel's Zone Magic and Eiger 3.5 solutions. Zone Magic is an enterprise wide extension of the company's Frame Magic and Split Remote



technology on Quantel Sq servers for secure and flexible local and remote media sharing. The solution presents work flow that can span across the room or across the country,

creating a bridge for broadcasters with two or more regional locations. Eiger 3.5 is next-generation technology for Quantel's iQ and eQ systems that features multi-tasking on effects, multi-layer import and off-line effects descriptors, new graphics shapes and mattes, a network conform for DI and animation, and more.

TRACKING / MATCHMOVING

PRODUCTS

Tracking with Boujou

2d3 has re-engineered and updated Boujou Bullet 2, an automatic tracking and match-moving system for challenging shots. The technology, borrowed from the company's Boujou Three software, offers a



new feature-tracking engine that the company says delivers a tenfold performance increase. Bullet 2 automatically identifies hundreds of features in each frame. The tracker handles temporary occlusions, extreme lighting situations, and radical camera moves, while tracking over many types of materials such as sand, snow, sky, fur, and hair. The software's polygonal masking tool can be used to isolate individual elements for motion tracking, or remove them from a camera solution using simply drawn animated masks. Other Bullet 2 features include an enhanced target tracker with zoom capabilities, image handling with 16 bit-per-channel image support, and a full range of image I/O. Bullet 2 is compatible with Boujou Three and all major 3D and compositing packages. Single license pricing is \$2500; upgrade pricing from Bullet 1.X is \$999.

spotlight

BROADCAST

USER FOCUS

Graphics on the Green

Once a Sunday afternoon-only televised sporting event, golfing has, on occasion, hit a round or two in prime time, as was the case with the recent *The Battle of the Bridges* on ABC. Even though the event had plenty of star power with golfing greats Tiger Woods and Phil Mickelson, the network added extra wattage with a dramatic show opener created by New York design/post studio Perception.

The show's introduction featured an array of complex 3D and 2D animation, motion-graphic design, digital compositing, and editing, and includes a sequence in which viewers feel like they are being pulled into a Monet painting.

The 90-second segment begins with the camera focused on a dimpled white orb, the starting point for the coverage of the match between pairs Woods and John Daly, and Mickelson and Retief Goosen. "This was big," says Daniel Gonzalez, visual effects director at Perception. "It was ABC Sports, it was

prime time, and it was the best golfers in the world."

Perception was approached to do the *Bridges* work by ABC, which liked the speed and ideas the group presented for an earlier project. According to Gonzalez, his team pitched eight concepts for *Bridges*, and ABC chose the most ambitious one, "which we saw as a clever twist on the typical sports open," he says.

Working on a two-week production schedule, the artists opened with the vast emptiness of space and an exploding star that resembled a golf ball—golf's version of the big bang. Next, the segment took viewers on a journey through the history of the world to present day, with a similar golf-centric point of view.

The scenes transitioned seamlessly through the ages. The first one contained what appears to be an ancient cave painting of primitive man perfecting his golf swing. Through sedimentary layers, the scene rose to one resembling ancient Rome, where the name "Mickelson" was etched into an archway, followed by an image of the great golfer composited into the period scene. As the camera pulled back, the visuals transitioned into a da Vinci world, where Daly's name and likeness appeared. Another seamless transition brought viewers into a three-dimensional Monet *Water Lilies* landscape featuring Goosen. The piece ended with Woods represented as the power and strength of the Industrial Age.

In the Swing of Things

For the big bang scene, the artists rendered the golf ball in 3D using Alias's Maya. From there, they composited together live-action footage of fire, which the crew had previously shot,

and combined that with still frames of star fields. The group also added matter to the background that it had created using Autodesk Media and Entertainment's Discreet Combustion. Meanwhile, the explosion was a combination of 2D, 3D, and live-action elements. "We like to shoot our own material rather than rely on plug-ins or out-of-the-box filters," says Gonzalez.

According to Jeremy Lasky, design director at Perception, the caveman golfer drawing was an element from the group's storyboard. The artists also located replicas of actual cave drawings, and then composited those, along with their own sketch, into an Adobe Photoshop digital still frame. Next, the team used Softimage's XSI to map the still onto a 3D wall. "We spent a lot of time lighting the image so it looked as though the light source came from torches," he says.

The group transitioned the segment into the subsequent scene by using XSI to track the camera upward through rock sediment, giving the feel of passing time.

Once in Roman times, the team blended 2D (background mattes) and 3D (the arch, crafted in Maya). Live action was used for the shot of Mickelson, which was rotoscoped from video footage provided by ABC. "We added a lot of layers to the composite to make the 3D come to life," explains Gonzalez.

As Lasky points out, Perception wanted the segment to be epic and cinematic. "One interesting aspect is when you come up from the ground, there's composited footage on the arch that we shot of 'the perfect golf swing,' made to look like it was engraved in the arch," he says. "When the camera pans across, you get a sense of motion from it."



For a unique opener to a prime-time golfing event, artists crafted a "golf through the ages" piece using a mix of 2D, 3D, and motion graphics.

spotlight

For the da Vinci era, the artists re-created da Vinci objects and animated them so it looked as though an invisible hand was drawing the elements, with the words appearing out of nowhere. The words, Lasky points out, are actually in da Vinci's own handwriting. "The inventor/artist had a distinctive script, and we used his sketchbooks to assemble the words," he says.

Then, to make Daly look "sketched" for the scene, the artists roto-scoped his swing from the footage provided, printed it on acetate, traced it by hand with ink, and scanned it back into the computer.

The biggest eye-catching effect in the spot appeared in the *Water Lilies* scene, made to have viewers feel as if they are being pulled into the painting. To achieve this illusion, Perception asked professional artist Stephen Lasky (Jeremy's father) to essentially deconstruct Monet's *Water Lilies* layer by layer on acetate, creating 10 individual sheets beginning with the background of the painting. So, layer by layer, the acetate reveals the artwork from back to front.

"After we brought the layers into the computer, we were able to create a camera move that pushed through the layers to give the viewers the feeling of being inside the art," explains Lasky.

Because the acetate layers were so large, the artists were unable to scan them into the computer; instead, they digitally photographed them. "That created a big challenge for us," says Lasky. "It is difficult to key watercolor acetate—anything you put behind it is going to shine through and swing the painted colors to the keyed color. So, you can't use bluescreen or greenscreen, since both are dominant colors in Monet's painting." As an alternative, the group used a "pinkscreens," since that's one color that did not appear in the painting.

To augment the clip, the team added footage of Goosen, the only live element in the scene. "The shot worked well because the actual Goosen footage we received starts wide on his swing and then zooms in close to show his reaction," says Gonzalez. "Our digital camera move matched perfectly with the ABC shot, resulting in a seamless sequence."

As Lasky points out, ABC wanted an opening to the golfing showdown that would be compelling, extremely stylized, entertaining, and effectively explain the premise behind the event. And, from the look of the piece, the Perception team delivered a round of shots that, in the golfing world, scored well under par. —Karen Moltenbrey

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HDV Everywhere

By Jay Ankeney

HDV is creating a swell within the industry, and the wave will soon be crashing the banks of video production, bringing with it confusion and excitement about what HDV is, and more importantly, what it is not.

HDV is not a new tape size or camera design. It is a recording format that can accommodate many different types of high-definition image acquisition. The

excitement surrounding HDV comes initially from the fact that the cameras are small and inexpensive.

Currently, both Sony and JVC have HDV camcorders on the market that sell in the \$5,000 price range. Other companies, such as Canon, have announced they are already following suit, although at a slightly higher price.

Are these mighty-mite cameras as good as the pricier high-definition cameras such as Sony's CineAlta line of HDCAM camcorders or Panasonic's VariCam? You may find the answer surprising. Naturally, the \$70,000 to \$100,000 cameras like the ones George Lucas used to shoot the *Star Wars* prequels boast more robust electronic

features; the lenses alone cost more than a single HDV camera. On the other hand, the little HDV camcorders can go places



their big brothers can't by squeezing into nooks and crannies, and utilizing considerably smaller cranes, dollies, and body mounts. They also offer the cost-savings of shooting to tape cassettes at one-tenth the price of HDCAM loads.

But, the question remains: How good are the high-definition images they record? Rental facilities can't keep HDV cameras in stock, and many prime-time TV shows are using them for second-unit work. Several network specials have already aired that intercut HDV recordings with HDCAM, and the list of independent feature films shot in HDV continues to grow.

A Variety of Options

Sony, being the first to market with an HDV camcorder, uses interlaced video—the same recording technique found in its consumer DV cameras. The Sony HVR-Z1U professional camcorder, for example, shoots high-definition 1080i pictures at 30fps and comes equipped with a Carl Zeiss Vario-Sonnar T 12X zoom lens.

JVC calls its approach ProHD, and the company's GY-HD100 camcorder records a progressive version of HDV or 720p running at 24fps. This camera can be mounted with interchangeable lenses, a feature that has garnered a lot of attention from image-conscious videographers.

But under the hood, things are actually a bit different. Although Sony's HDV camcorder can produce true 1920x1080 interlaced images, it is actually recording at only 1440x1080 on each interlaced field, and the progressive pictures from JVC are actually only 1280x720 resolution. So even though the output from those cameras matches the full-pixel count expected from 1080i or 720p high definition, there is some digital scaling going on to accomplish that resolution.

Sony's Hugo Gaggioni, CTO of the Broadcast and Production Systems Group, says demand will continue to drive technology at Sony. "Our family of HDV products are based on 1080i/60 but we will be expanding that in the future. We feel 1080i based on the 1920x1080 pixel array produces the highest temporal resolution."

Conversely, Dave Walton, JVC's general manager of marketing communications,

Jay Ankeney is a freelance writer, editor, and postproduction consultant living outside of Los Angeles.

Inexpensive and flexible, HDV offers the creative community plenty of options.

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says its 720p/24 approach is designed to appeal to digital cinematographers. "Since the GY-HD100 records a 24p progressive signal, this gives you the ability to have much more solid still frames without interlace jitter, while giving you a more film-like look to the high-definition recordings. You can view this progressive recording on any high-definition display, or the camcorder's composite video output will provide a 30fps standard-definition signal for viewing on conventional NTSC monitors."

The trick, of course, is squeezing the high-definition signal onto that tiny 6mm mini DV tape. After all, uncompressed 720p and 1080i high-definition clocks in at about 1.5Gb/sec, yet the 30fps Sony version of HDV runs at around 25Mb/sec.



The new Avid Express Pro 5.2 is now part of the native HDV editing wave, allowing users to mix different high-definition formats with HDV on the same timeline.

JVC's 24fps variety uses only a 19Mb/sec data stream. The magic lies in what the HDV consortium did with the structure of MPEG-2 compression. Instead of each video frame having its own identity, it spreads the information over an MPEG-2 Group of Pictures, or GOP, that can be up to 15 frames long. And the reality is that some of those frames don't really exist outside of the GOP itself. There are "I" frames, which "initiate" the GOP, "P" frames that "predict" what is to come, and "B" frames that look "bi-directionally" to increase the encoding efficiency.

HDV is easy to record, but how do you take something that may not "actually" be there into postproduction? The

easiest way is to convert it into something that any conventional HD system can handle. During the last two years several companies have made video boards available that can use HD-SDI to crank up the scrawny HDV signal into full-bandwidth high definition that could be imported into many HD graphics and editing systems. New developments emerged at IBC2005 this past September that offer many new options. For example, AJA Video introduced its Kona LH board that lets you convert from HDV into Sony's HDCAM or Panasonic's DVCPRO HD format directly on a single PCI card.

There have been several editing systems, such as Adobe's Premiere Pro, Canopus's EDIUS, Sony's Vegas, and Leitch's VelocityHD, that provide the option of transcoding HDV into proprietary file formats for easier editing. While these file formats often have the advantage of increasing the amount of available chrominance information in the signal for tighter compositing, they also require far more storage space because they sacrifice HDV's inherently efficient datastream.

To keep things simple and maintain HDV's cost-efficient potential, you can manipulate HDV without conversion by staying "native." Many of the major editing system manufacturers have been chasing themselves in an effort to provide solutions for cutting the long GOP format without conversion. Pinnacle Systems was the first to demonstrate native HDV editing with its Liquid Edition nonlinear editing software during NAB2004. Using a combination of a DirectX 9 GPU and the workstation's own CPU, the system could handle up to four layers of HDV in real time.

A year later, Apple wowed the crowds at NAB2005 with Final Cut Pro 5 software, invoking the new architecture of QuickTime 7 to decompress and reconstruct the long GOP cadence at the cut point. The Final Cut Studio software suite even included DVD Studio Pro 4, which could output an edited HDV program to disk for playback on a Macintosh G5 workstation.

Avid Technologies recently released Version 2.2 of its Avid Media Composer Adrenaline HD and Version 5.2 of its Avid Xpress Pro systems, allowing users to leverage its DNxHD codec to mix different HD formats with HDV on the same timeline. The codec also gives you the flexibility to distribute mastering-quality HD over a network designed for SD video throughput.

Still, the bottleneck to mainstreaming HDV production remains. What do you do with that trickle of a datastream once you have finished posting it? Bumping back up to broadband HD would defeat the purpose, yet consumer-level playback devices have not been available—except for the aforementioned Macintosh G5 disk option. That is, until now.

JVC has released its new SRDVD-100U ProHD disk player priced at just \$400. Now you can save your HDV projects on an inexpensive recordable DVD disk with any standard DVD burner and get up to 30 minutes of full HD playback on a 4.7GB single-layer disk or 60 minutes on dual-layer DVDs.

And, increasingly, you can find HDV aficionados streaming their clips over the Web. There are several codecs that can facilitate this, but one of the best is free—the VLC Media Player, which is available for almost any operating system from the VideoLAN Web site at www.videolan.org.

So now if you decide to catch a ride on the HDV wave, you can shoot affordably with the new HDV camcorders, post in a native format, and distribute your HDV productions to anywhere in the world. It's a wave that is bringing high-definition production capabilities to everyone. ■■

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The Sky's

Chicken Little leads Disney into the digital frontier

By Martin McEachern



For *Chicken Little*, its first all-3D feature film without partner Pixar, Disney hatched a new CG animation approach that is based on its tried-and-true traditional techniques.

Images © 2005 Disney.

Over a span of 77 years, Walt Disney Studios pioneered and perfected the relatively young art form of hand-drawn animation. From squash and stretch and overlapping and secondary action, to slow in and slow out, Disney founded the fundamental principles of animation and became home to the most talented artists in the world. Collectively, these artists have made the studio the gold standard in traditional feature animation and the icon of quality family entertainment.

By the turn of the century, however, Disney, in partnership with Pixar Animation Studios, was producing 3D films that widely outperformed its hand-drawn movies at the box office. Thus, when Pixar decided to secede from the alliance following the release of *The Incredibles* (see "Hero Animation," November 2004, pg. 18), Disney chose to adapt the talent of its "Grade-A" 2D animators to the digital realm. This month, Disney's decades-old legacy will be carried into this frontier on the wings of *Chicken Little*, the studio's first solo foray into all-3D features.

"Finally, we were able to put these amazing 3D tools into the hands of the greatest painters, animators, and effects artists in the world," says *Chicken Little*'s visual effects supervisor Steve Goldberg.

Far from abandoning its hand-drawn roots or copying Pixar's aesthetic, Disney's mandate for *Chicken Little* was to stand on the shoulders of its 2D heritage and capture, through the same use of squash and stretch, staging, and theatrical lighting, the spirit of animation as seen

the Limit

in films such as *Peter Pan* and *Alice in Wonderland*, and especially the wild, fluid motion of the 1942 Goofy cartoon “How to Play Baseball.”

Hatching the Idea

In the works for more than five years, *Chicken Little* was conceived while director Mark Dindal was trying to apply real-world logic and human motivation to his favorite children’s stories, a process that spun the tales into interesting and often humorous directions. “I always thought it would be fun to ask questions like, Why would this character do that? In ‘Little Red Riding Hood,’ for example, the wolf could eat the girl when he first meets her, but instead takes this long detour and disguises himself as her grandmother,” he says. “Suddenly, the characters become more interesting and complicated.”

While toying with this concept, Dindal was developing another, separate idea about misfit farm animals that get left behind when all the pretty animals are off being judged at the county fair. While they’re away, aliens invade the planet, leaving the misfits to save the world. “One night, these two ideas merge and solidified into *Chicken Little*,” says Dindal.

The film begins one year after Chicken Little was conked on the head by a falling acorn, only to proclaim the sky was falling, causing panic in his town of Oakey Oaks and shattering his father’s faith in him. Now an outcast, the bird tries to redeem himself and regain the respect of his father, Buck Cluck, by joining the local baseball team. After leading the town team to an upset, he is conked on the head yet again—this time by a chunk of UFO.

Afraid of losing his newly rehabilitated reputation and the hard-won respect of his dad, Chicken Little remains mum about the incident. Instead, he enlists his misfit friends—Runt of the Litter, a timid 400-pound pig; Abby Mallard, an ugly duckling; and Fish Out of Water, a wide-eyed exchange student from the ocean—to return a missing alien child named Kirby to its parents and save Oakey Oaks from an alien “coop d’etat.”

To visualize this story, Disney selected 50 percent of its new CG animation team from the traditional ranks, and put them through a rigorous 18-month training program, which included an introductory to Alias’s Maya, the main 3D commercial software used by the studio on the project. Despite the intensive 3D education, the underlying technological focus of the production was preserving the quality of hand-drawn animation and ensuring that no limitations were placed on the artists’ ability to apply those techniques in the digital medium. Shouldering this respon-

sibility was an enormous challenge for Goldberg and his team because Dindal wanted the animators to push the principles of animation to extremes.

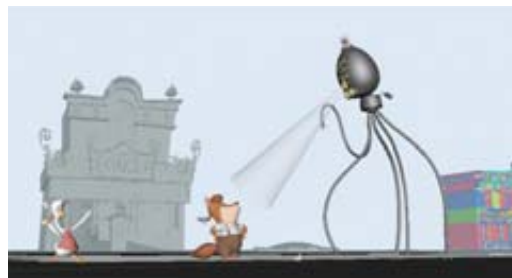
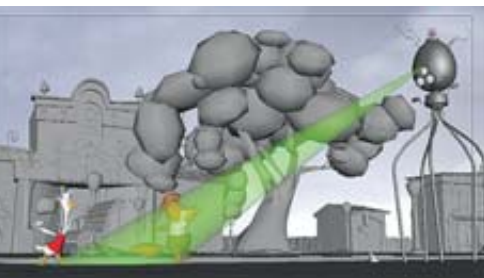
Resurrecting the Past

In the same spirit as the Goofy cartoon, the animators infused the characters with broad caricatured movements rarely seen in CG films. For instance, during Chicken Little’s baseball game, the windup and delivery of the stork pitcher boasts a level of cartoon exaggeration that belies the puppet-like, or mannequin-like, feel normally associated with even the best CGI. When a groundhog slides into second base, his cheeks flap around wildly, buffeted by g-force winds.

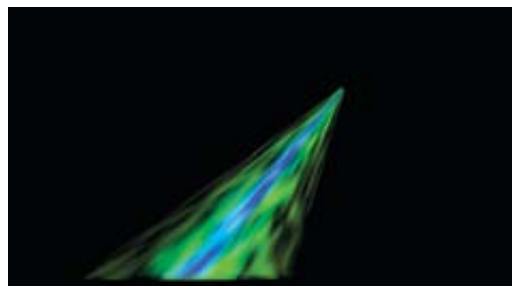
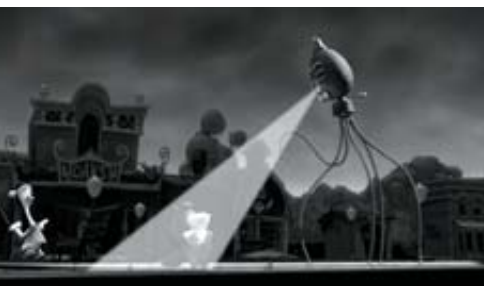
Bringing this hand-drawn feel to CG required a tool that could provide a seemingly endless variety of unique shapes for the characters. To accomplish this, Disney created a collection of wire deformers that allowed the animators to pull out variations on the blend shapes already defined by the rigging department.



Disney modeled and animated *Chicken Little* and his misfit friends using Alias’s Maya, employing the same “roundness” in their designs that can be found in early Disney movies.



All the image phases from the layout to the final frame were done digitally in Maya. This series of stills (from top left) shows the progression of imagery leading to the completed frame: scene layout, animation, lighting, visual effects, and the final shot of the alien shooting its ray that washes the scene in a green glow.



Dindal also directed the filmmakers to seek the same “roundness” in the character designs and animations as seen in the Disney films from the ‘40s and ‘50s. This rounded aesthetic also extends to the designs of the Oakey Oaks set, where bulls own the china shop, penguins operate the tuxedo shop, and worms run the bookstore. The off-kilter architecture of Oakey Oaks is always curving and whimsical, devoid of straight and parallel lines, right angles, and concentric circles. Nothing is symmetrical.

Oakey Oaks was divided into a number of “locations,” such as the town square and Cluck Street, where Chicken Little resides. Layout artists then divided these locations into “sets,” which comprise a particular side of a street and all the individual storefronts lining it, and drew upon a library of stock buildings to furnish those locales. “We created ‘look variants,’ which basically altered the shader parameters of the same building,” says Goldberg. “If you look closely, we had some shots with a couple of fire stations.”

With the story line constantly evolving, layout artists built the town square to hold up in medium shots, adding detail as the story was finalized. While digital matte paintings were used sparingly, artists occasionally rendered out elements, such as trees and the baseball diamond, and retouched them in Adobe’s Photoshop for use as background cards.

Dindal also tried to emulate the staging, color, and lighting of legendary Disney artist Mary Blair and the films she influenced, such as *Peter Pan*. Studying the way she staged action and used theatrical pools of light to guide the viewer’s eye, the artists designed *Chicken Little*’s shots so that the characters would appear light over dark or dark over light. “Sometimes we’d create complex, fake shadows, or come up with something just off screen to justify the shadow,” says Goldberg.

To light the sets, the artists used Disney’s Lumiere, which plugs into Alias’s Maya and feeds

into Pixar’s RenderMan. Partly Mel-scripted, Lumiere’s interface facilitates the automatic propagation of lighting rigs throughout similar shots, and uses standard keys, fills, and bounces.

In addition to using geometry and virtual lights to create shadows, the lighters often projected real light through actual materials and filmed the shadow patterns, creating cookies, or “cucaloris.” These filmed shadows are most noticeable during a flashback to the day when Chicken Little, seated beneath an oak tree, is first struck on the head. Artists used these cookies to create the soft shadows from the dappled lighting filtering through the tree canopy.

Chicken Wire

Hand modeling all the characters in Maya using subdivision surfaces, the artists created Chicken Little with 5636 polygons, Runt of the Litter with 6627, and Abby Mallard with 12,781, half of which reside in her hair alone. Like most of the characters, Chicken Little’s body comprises separate pieces of unattached geometry. For example, his arms were not connected to his body, nor were his hands connected to his arms; instead, they were bound to the body with joints hidden under his sleeves.



Disney employed a curved, whimsical design aesthetic to the film’s environments that is apparent in this view of the buildings and objects in the Oakey Oaks town square.



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Watered Down Animation

During gym class, a bully pulls Chicken Little's comb back like a slingshot and catapults him into a window; as he slides down the glass, he grabs hold of the fire alarm, setting off the sprinklers. To slowly turn Chicken Little's dry feathering into a bedraggled mess for this scene, the artists applied displacement maps and adjusted such properties as specularity and clumpiness within Disney's XGen fur tool.

Nevertheless, in an effort to re-create the stylized cartoony splashes they were accustomed to creating in 2D, the traditional animators often sought out novel approaches to fluid simulation.

For instance, when Chicken Little is training to make the baseball team, he runs alongside Fish Out of Water, who gives him what he thinks is a squirt from a water bottle. When he realizes the water came from Fish's aquarium-like helmet, he does a "spit take." In another scene, Chicken Little is doused with Gatorade after making the game-winning hit. Animating these fluid effects was Peter De Mund, a traditional animator who, like half of the effects department, was making the crossover to CG.

"De Mund took the approach that he would have taken in 2D, but applied it to 3D," says VFX supervisor Steve Goldberg. "He essentially sculpted chunks of geometry frame by frame to get the designs he wanted, producing exquisite cartoony drips and splashes. This didn't seem like a crazy idea to him, because he used to have to draw all these little water droplets in 2D. It sounded crazy to us, before we realized he was plowing through it much faster than most people would have taken to render and repeatedly tweak the simulation."

Like the character animators, De Mund also used Disney's Show Tool and a Wacom tablet PC to rough out the fluid animation in 2D before re-creating it in 3D.

Later in the film, when fluid effects become more abundant, effects supervisor Dale Mayeda introduced Next Limit's RealFlow into the production. For complicated effects, the artists combined De Mund's handcrafted fluid animation techniques with RealFlow's simulation. —MM



For the character facial animation in *Chicken Little*, the artists used wire deformers, called **Chicken Wire**, that enabled them to tweak a basic set of blend shapes into just about any facial pose they needed.

"This simplified the animation process," says supervising animator Jason Ryan. "I could rotate his hands and arms two million degrees and not have things get twisted up."

For the facial animation, the artists created a set of basic blend shapes in Maya. Over these, they added a series of wire deformers called Chicken Wire, allowing the animators to tweak the basic shapes into any facial pose they desired. "We'd have blend shapes to get us 80 percent there, then we'd use the Chicken Wire controls along the upper beak, lower beak, or on the brows to shape and tweak them, and get a nice graphic for the camera angle we were animating to," explains Ryan.

Unlike traditional wire deformers, which can only be translated, the clusters along Disney's Chicken Wire—called Chick Clusters—can be scaled, translated, and rotated. Audiences can see the Chicken Wire effects most prominently on Buck Cluck, as they added great subtlety to his facial movements. With Chicken Little, on the other hand, Ryan went very broad with his animation, using a lot of squash and stretch and relying less heavily on the deformers.

Using bones and IK handles in Maya, the artists rigged the characters with a "broken" rig setup, allowing them to translate any portion of the rig without affecting the rest of the skeleton. "The animators could select the hip bones and translate them 20 feet away, and it wouldn't affect where the chest, shoulders, head, or feet were," explains Ryan. "This provided a lot of flexibility for squash and stretch."

Still, each character's performance



posed its own challenges. For example, the skittish Runt of the Litter is a huge mass carried by dainty legs that take tiny, fear-ridden steps. "When he came to a curb, he would actually have to stop, anticipate, and jump up. He took everything very carefully, except when he got scared, whereupon he would just take off," says Ryan. "We weighted him so that his bottom half would drag his top half. This meant his little legs would start running, but his top half would drag behind a little bit. And when he stops, he would follow through a little, instead of just stopping on a dime like Chicken Little."

Crossing the Digital Divide

In making the transition to 3D, Ryan, a former 2D animator, developed a method of working that shortened the learning curve for the other traditional animators. "Because computers aren't real time yet, we needed something intuitive and familiar, so I would start working on a Wacom tablet PC, just trying to solve the performance with some rough drawings. Once the director liked the performance, I would then use Maya as my cleanup tool, posing

the skeleton to match the poses I had drawn on the tablet.” That approach proved so successful that all the 2D animators were given Wacom tablets running Disney’s Show Tool software for sketching out their animations and perfecting the animation timing.

“I went from doing 3 or 4 feet per week on *Dinosaur* to over 16 feet a week on *Chicken Little*,” adds Ryan, referring to Disney’s 3D film that used photographic backgrounds (see “Beauty...and the Beasts,” May 2000, pg. 22).

A tool called Shelf Control—akin to a Fisher-Price version of Maya’s Hypergraph—simplified the selection of character geometry and rigging. Instead of a node tree, the animators would see a flattened-out character, and by selecting the head, fingers, or other body parts, they could choose the corresponding joint on the model. Meanwhile, Disney’s Timing Chart replicated the charts that 2D animators are accustomed to using for their keyframes.

As a matter of fact, capturing the snappy, energetic feel of traditional 2D animation demanded a lot of keyframing. “There was almost a key on every frame; very little was left to the computer,” notes Ryan. “In contrast, on *Dinosaur*, we’d have a key at Frame 1 and a key at Frame 9, and let the spline do the rest.” So that the animators could define a character’s silhouette as precisely as they would in 2D, the artists applied numerous influence objects (which were more predictable) and added Maya’s sculpt deformer to the Chicken Wire deformer.

Smear frames, in which a character’s face stretches out during a fast head turn, for example, were also accomplished using influence objects and Maya’s sculpt deformer. “We’d fatten out the face for one or two frames, just to add a little more fleshiness to the character,” explains Ryan. In fact, the animators limited most of the extreme squashing and stretching to a few frames, to add a sense of elasticity and yet eliminate the “rubbery” look.



The artists had difficulty expressing Chicken Little’s emotions, since his black eyes are devoid of pupils. To overcome this, they would turn his head around to convey an eye direction and thought process.

Feathers and Fur

Because of the extreme elasticity of the characters, Goldberg’s job was to ensure that the mesh held up during later stations in the pipeline and that the fur solution supported the squash and stretch. This would prevent the fur and feathers from thinning out or compressing unnaturally during deformation.

Disney’s proprietary fur tool, XGen, received a full rewrite when Disney made the leap from NURBS to subdivision surfaces following the completion of *Dinosaur*. As a result of the tool, Chicken Little sports more than 76,000 individual feathers; 55,000 of those are on his head, while 9000 adorn each arm. Using guide splines and a host of channels for mapping color, density, and other properties, XGen produced all types of feathers and fur—from long, traditional feathers to small, fluffy, down-like feathers, and even the long spikes of Morcupine Porcupine.

For complicated collisions between the fur and the geometry, such as when Chicken Little runs his hand through his hair, the animation department collaborated closely with the Character Finaling department, which was responsible for cleaning up self-intersections, pinching, or other defects following the animation.

After progressing through the Character Finaling department, the animations were sent to the effects department. There, effects animator Rob Rosenblum created a proprietary wind-simulation tool within XGen that applied a set of forces to the fur and feathers. This is most noticeable during the climax, when the heroes stand atop a building to deliver Kirby as the mothership looms overhead, and the rising wind ripples their plumage violently.

Once the dynamic simulations were added in the effects department, the Shot Finaling department composited the scenes in Apple’s Shake and rendered them in RenderMan via MTOR, a Maya-to-RenderMan file converter.

New Beginnings

Chicken Little represents a new day for Disney, and will be used by critics and industry experts to evaluate the future of the company in the vanguard of CG feature animation, which is currently held by Pixar and DreamWorks. The film not only represents a new beginning for many traditional animators, but also an unprecedented collision between the worlds of 2D and 3D animation.

“*Chicken Little* was such a breakthrough picture for so many artists,” says Ryan. “That’s because a lot of the CG crew had never animated cartoony, character-driven stories, while the 2D crew had no CG experience. They really helped each other.”

Now hard at work on its next feature-length film, *A Day with Wilbur Robinson*, Disney is continuing this unique marriage of disparate talents—a plan that just may result in some new Disney “classics.” ■■

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●●●●● Film

The Game's Afoot

Digital effects help
shift time and space
in the movie Zathura

By Barbara Robertson

A children's board game called Zathura sends players into outer space, thanks to digital effects created, in part, at Sony Pictures Imageworks.

The question is, What if board games were real? Author and illustrator Chris Van Allsburg has turned that flight of fancy into two children's storybooks, and the storybooks have become films that rely on effects rather than Allsburg's drawings to realize the fantasy. For the 1995 movie *Jumanji*, Industrial Light & Magic brought a jungle of CG animals into young Danny and Walter Budwing's lives and living room to scary effect, developing custom hair simulation and facial animation software to do so.

Now, Allsburg's second story, *Zathura*, is being lifted off the pages and enlivened in film: Directed by Jon Favreau of *Elf* fame, Sony Pictures Entertainment's *Zathura* opens November 11. In *Zathura*, the shift in time and space happens not in a jungle but in outer space, where the brothers dodge meteor showers, a dysfunctional robot, lizard-like aliens called Zorgons, and the pull of the black hole named Zathura.

In keeping with the film's style, which visual effects supervisor Pete Travers describes as having the look of "an old science-fiction movie," the storybook adventure blends practical and digital effects. "The design had to look like it was born out of a board game created in the 1950s," he explains. Sony Pictures Imageworks handled 200 digital effects shots, Café FX created a CG character, and Digital Dimension also lent a hand.



Although the house is a miniature, the clumps of dirt are real, and the fire is made of photo elements, this final shot was composited digitally.

As in most effects films these days, the digital sleight of hand was a mixture of raw R&D with tried-and-true methods from, in Imageworks' case, *Spider-Man 2*, *The Haunted Mansion*, and *The Polar Express* (which was based on a Christmas story by Allsburg).

"Producers like to know we aren't reinventing the wheel for every effect," says David Seager, one of three CG supervisors on the film. "But we started from a blank slate for a handful of things."

Meteor Shower: Take Evasive Action

The effects start when the boys pop up the first game card, which reads, "Meteor Shower Take Evasive Action." As the card predicts, meteors start bombarding the house. Because this sequence sets the stage for action to come—each card has a new frightening result—the director wanted a high level of energy. "He wanted creative control over where the meteors

would hit for the greatest visual impact," Travers says.

Imageworks provided that control. The first step was matching the camera moves used to film actors pretending that meteors were flying through the room. The matchmovers used Alias's Maya, which was also employed for modeling and animation throughout the show. "In addition, the matchmove department generated basic geometry for the environment so we had our bearings," says Seager.

Next, based on the boys' movements, layout artists began plotting the timing and placement of the meteors. "If an actor had changed direction abruptly, the director wanted it to seem like he had reacted to a meteor," Seager explains, "but we didn't want it to be too scary."

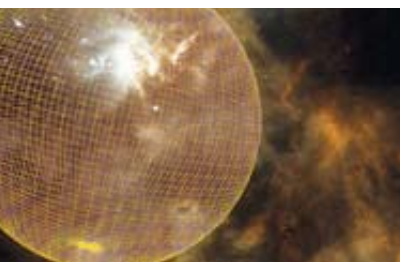
After the director approved the choreography, effects artists began putting hundreds of meteors into the scenes in front of and behind furniture and other objects in the room. Although the meteors are pieces of fiery orange geometry,



(Top and right) In keeping with the style of the film, practical effects were often composited into the live-action plates, as was required for these scenes.



●●●●● Film



To heighten the drama, Imageworks modeled Saturn and then used fluid simulations to create gaseous storms on the surface. Next, they added an asteroid belt, rendering various-sized icy rocks in layers. Then, they placed the children's house on the belt and, to create a sense of depth, put large asteroids in the foreground.



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they move so fast through the scene that the audience sees only the smoke trails left behind.

The technique for creating the smoke trails evolved from technology called Strands, which created the misty atmosphere in Disney's film *The Haunted Mansion*. Using tools that work within Side Effects Software's Houdini, the effects artists started the tasks by identifying an impact point and the timing of the hit. "The system backtracked the speed and the angle the meteor had to travel, and generated a coarse particle trail," says Seager, "and it generated sparks from the impact points."

That particle trail became the starting point for a simulation that was modified with such parameters as buoyancy, noise, and turbulence to produce a refined smoky stream. "We didn't want dense, thick smoke because the room would have been too dark," Seager says. "So, we experimented until we got a gentle smoky trail."

Because the actors had been filmed in a room with holes cut into the floor for the meteors, the compositors—using Imageworks' proprietary Bonsai software—painted over those holes and added others to match the postproduction choreography. To complete the illusion, they layered in sparks and placed flames on the rims of the holes.

On the Edge

In a second major digital effects sequence, Danny opens the front door and sees that the house is on the edge of Saturn's rings. For this shot, everything outside the door is CG. A matte painting with nebulae and stars mapped onto a curved surface forms the background, and 3D asteroids ring the planet, which is itself a 3D object with fluid simulations creating gaseous storms on the surface.

CG supervisor Bob Winter's team started with NASA photos of Saturn as references, but

soon realized that re-creating reality wouldn't be dramatic enough. "Saturn is very simple," says Winter. "The surface has uniform rings with subtle hue shifts between them. It's boring. We needed to add more life to it."

Instead of looking at Saturn, they decided it would be more dramatic to put the house on the edge of an asteroid belt and orient the camera straight down the belt. To create a feeling of depth, they populated the belt with asteroids in a variety of sizes.

Modelers working in Maya built a library of 25 rocky asteroids that were instanced into thousands. "We rendered them in layers," Winter says, "to control the hue shifts." By placing lights behind the rocks and using subsurface scattering, the artists made areas of the asteroids translucent, to create the effect of dirty ice crystals in the rocks.

During another sequence, the boys' house is pulled toward a make-believe planet, the fireball Tsouris3. "We needed to create a rock-encrusted planet that had a lot of volcanic activity," says Winter. "[The director] wanted bursts of smoke and debris coming out of the volcanoes. And, to show the house moving close to this planet, we needed an immersive atmosphere."

For this, Imageworks started with a procedurally-generated reddish-orange base texture on the planet's surface and then layered, in Adobe's Photoshop, textures of mountain ranges. For the corona, they used multiple levels of volumetric rendering with various noise patterns that were rendered out in layers. At the end of the process, compositors tweaked the levels and colors to complete the immersion illusion.

Your Robot is Defective

Meanwhile, inside the house, a robot appears when the boys draw a card with the message:



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“Your Robot is Defective.” Travers describes the robot as a “giant, lumbering character that destroys half the house trying to get the kids.”

The robot looks something like a windup toy from the '50s, with a barrel chest, thin legs and arms, and two antennae. For an exploding door sequence, Imageworks created an entirely CG robot; however, for most scenes, because the director wanted to capture the robot “in camera,” the production crew filmed a stunt actor, clad in a black leotard and wearing a robot’s torso and head. Imageworks later painted out the actor’s legs and arms and, working in Maya, replaced them with skinny, robotic appendages.

Once the camera was matchmoved from the scanned live-action film, rotoscopers created the matching CG torso. Animators could see the live-action torso from the photographed image and, on top, a transparent replica in CG with digital arms and legs.

“Because the torso doesn’t deform, once the matchmovers lined up the CG torso, we had a dead-on lock for the performance,” says Winter. “The only tricky part was when the human actor ran and we got squash and stretch in the spine. So, when we replaced his legs with the CG legs, our animators had to compensate for that.” They did this by separating the upper and lower body and creating a piston motion between the two to absorb the difference.

To render the reflective metal of the robot—whether all CG or part CG—as it walked through the live-action scene, the team used Pixar’s RenderMan and reflection cards. These cards were 2D planes with images of the interior projected onto them; the images were provided by the production crew. “We built our own reflective house so that the robot would correctly reflect the interiors as it went from room to room,” says Winter. To determine which part of the robot’s surface would actually reflect the surroundings, they used reflection occlusion passes—if the robot raised its arm, the surface beneath would not be rendered with reflections. “The most tedious part was setting up the surface so that it matched every little smudge of grease and every scratch in the practical robot,” says Winter.

You Have a Zorgon Problem

The reptilian Zorgons fly battleships that resemble old iron warships with rusted cannon doors and furnace-lit interiors. Sometimes the ships were practical—eight-foot models filmed on greenscreen stages. Sometimes the ships were CG. But even the practical ships needed CG touches: When a practical ship pulls up outside the boys’ window and fires a cannon into the house, effects artists added digital smoke and cannon blasts. “We also added practical fire to a fireplace where the boys were

hiding, and digital fire to augment digital debris,” says CG supervisor Bob Peitzman.

With one exception, the Zorgons themselves were hunched-over stunt actors wearing suits created at Stan Winston Studio. The suits included a head and neck that protruded from the actor’s chest; a bluescreen hood covered the actor’s own head. Thus, for every shot with a Zorgon, Imageworks removed puppeteering rods and wires and the bluescreen head, and added spikes and plates from the front to the back.

“The matte painters supplied the spikes,” says Peitzman. “We matched the performer’s actions in varied, changing lighting conditions and angles without doing a full-CG replacement.” For this, compositors worked in Autodesk Media and Entertainment’s Discreet Flame software as well as Imageworks’ Bonsai.

In one shot of a lizard jumping up into the spaceship, how-

ever, the suit was too heavy for the stuntman, so Café FX created a CG Zorgon. “It took several months to create the shot because the Zorgon is such an intricate model,” says Vicki Gallowayweimer, visual effects producer for Café FX. “He has armor on his knees, shoulders, and elbows, and plates that move.”

Café FX built the model in NewTek’s LightWave, animated the character in Maya, and rendered it with Mental Images’ Mental Ray. For compositing, the team used

Eyeon Software’s Digital Fusion to layer the character into Imageworks’ files and plates. “When you have only one shot that’s CG against live action in the entire movie, you have to be very deliberate about matching the way it looks, the way light hits it, the way it moves,” Gallowayweimer says.

The Pull of the Black Hole

During the climax of the film, the Zorgon aliens circle and shoot at the boys in their house, and then the aliens—and the boys—discover they’re all moving close to a black hole. Outside, a camera floats in space and looks at the unfolding scene; inside, the house is breaking apart.

Surrounding the house were as many as 60 Zorgon ships—a combination of miniatures and CG—that banked around the house and shot at it. The CG ships were built in Maya with subdivision surfaces and were lit using techniques honed on *Spider-Man 2* for ambient occlusion, reflection occlusion, key lighting passes, and rim lights. The shots were all rendered through RenderMan.

The stars and other elements in the background were created with procedural techniques in Houdini that populated a virtual sphere with patterns matching those on a painted tarp. “Any direction you looked, you’d see stars and also the gas surrounding the stars so that the black of space is not just space,” Seager



In most scenes, the robot is an actor in a suit, whose arms and legs were replaced by Imageworks with CG appendages. Occasionally, however, it’s an all-CG model.

explains. The stars were dots, but sprites created the blue cloudy areas around the stars and the nebula.

For the sprites, the team drew from a large library at Imageworks containing clouds and other elements, photographic and painted. “We had a system set up so that once the camera was matchmoved, we could flip a switch and run out passes for the stars,” Seager says. “For the most part, getting to Version One was quick. Then, we’d begin tweaking elements.”

Imageworks’ custom Splat renderer, which was developed for *The Polar Express*, made quick work of rendering the sprites. They used it to help render debris for the house destruction, as well. “We had two types of destruction,” Seager explains, “explosive destruction from Zorgons shooting the house and, later, the house getting ripped apart as it nears the black hole.”

For exterior shots of the house destruction, the production crew filmed a miniature model that pulled up chunks of dirt as it was ripped from the ground. Because they destroyed the house during filming, the crew shot the destruction sequentially. “We received a lot of before and after plates,” says Seager, explaining that they wanted multiple motion-control passes as well as matte passes because the house was rim lit; rather than trying to pull mattes from the rim-lit shots, the compositors used the greenscreen passes.

To manage the debris, Imageworks created a system in Maya named the Debris Hose. With the “hose,” they could specify a location or direction and shoot debris toward it. They created the debris by pulling predefined geometry from a library, instancing it, and attaching the geometry to particles. The particle simulation determined the motion for all but a few pieces of hero debris; animators keyframed hero elements. “In some cases, we had to custom-model interior bits, such as pieces of wall with wires sticking out,” says Seager.

The black hole itself was a combination of practical and CG elements. To create its fiery rim, the production crew mounted a camera to a black disk. “From the camera, you see fire shoot-

ing out from a ring of black,” says Seager. The fire was created with practical explosions.

At Imageworks, the scanned film was slowed down and run backward so the fire looked like it moved from the outside in rather than the inside out. “We had done early tests using all CG for the black hole, but Joe Bauer, the VFX supe, wanted to try this,” Seager says. Thus, rather than “chasing down a gaseous flowing effect in CG,” as Seager puts it, they picked elements they liked from 20 minutes of fire footage—sometimes entire frames, sometimes a small piece of a frame.

Compositors meshed these elements in Autodesk’s Discreet Inferno to produce an image looking straight into the black hole. The 3D team then positioned that hole in the 3D environment, rendered it out, and handed it to compositors working in Bonsai to blend with the rest of the action.

One of the last pieces in the puzzle was the Zargon ships’ thrusters, which spewed fiery elements. For this, practical fire shots were mapped onto 3D cards.

Game Over

In addition to the major sequences, shots throughout the film were augmented and enhanced. When it was too hot for the stunt Zorgons, effects artists added fire. There were also lightning flashes, explosions, and even a CG goat (modeled and animated in Maya) that greets one of the brothers as he climbs onto a Zargon ship.

“It was nice to have a full range of work on this show,” says Seager, “from tried-and-true traditional work like the robot to raw R&D like the Tsouris3 planet.”

The show also gave the Imageworks team a chance to try new methods of working. “Some people specialized, particularly those working on the spaceship and on the star fields,” says Peitzman, “but 80 percent of the time, people did both 3D and compositing. That’s become more the norm these days at Imageworks.”

Allsburg’s stories make pretense—a board game—real, albeit an impossible, exaggerated reality. In the 10 years since film-

makers brought his first board-game-based story to life with digital effects, that story premise still holds. Similarly, although the tools have changed and the artists have gained experience, the premise for making effects remains the same: Fit the effect into photorealism and make it believable—even when that means putting a house on the rings of Saturn. ■■

Barbara Robertson is an award-winning journalist and a contributing editor for *Computer Graphics World*. She can be reached at BarbaraRR@comcast.net.



To put the fire into this fireplace where the children are hiding, Imageworks used practical fire. The house is destroyed throughout the film with the help of digital debris.

OUT OF CHARACTER



Filmmakers take virtual actors out of the game and into a Web sitcom

By Karen Moltenbrey

Whoever said you can't mix business and pleasure never met the guys from Rooster Teeth Productions: They produce Webisodes, or Web-based episodic shows, using content from their favorite computer game, *Halo*.

The weekly episodic CG series, called "Red vs Blue: The Blood Gulch Chronicles," comprises five minutes of animated game-play video set within the game's world. However, it places the *Halo* characters in a unique situational comedy that, unlike the game, is not interactive. This process is accomplished using the new genre machinima, or 3D game-based filmmaking (see "Making Machinima," pg. 26), whereby segments from a computer game are captured on video and editing together for a uniquely scripted mini-movie. And, it appears that the series is taking the Internet by storm, just like *Halo* did in the gaming space.

"The way we create the illusion of an actual story taking place in 'Red vs Blue' is through editing, sound effects, dialog, and so forth," says Mike "Burnie" Burns, who founded Rooster Teeth more than two years ago with Geoff Ramsey, Gus Sorola, and Matt Hullum.

For the self-proclaimed gamers at Rooster Teeth, playing the Microsoft Xbox flagship title—about the futuristic super-soldier Master Chief and his battle against an alien race known as the Covenant—has dominated their pastime. Introduced by Bungie Studios in 2001, the

story-driven first-person shooter became a megahit, and late last year, legions of fans rushed to the stores to buy the follow-up, *Halo 2*, which smashed first-day sales records that even outshined the box office's best (see "The Halo Effect," January 2005, pg. 16).

In the case of "Red vs Blue," Rooster Teeth uses *Halo* to act out the science-fiction comedy, which is also about a group of marines stationed in a desolate canyon somewhere in the universe. "There is a Red Team and a Blue Team (just as there are in *Halo*), and they have no idea why they are fighting each other," notes Burns. "They just know they are situated somewhere in the middle of nowhere, and have to protect their base at all costs."

Rooster's Roots

As Burns points out, you don't have to be a hard-core gamer or *Halo* player to enjoy the Web movies. Yet, it was Burns's admitted obsession with the game that actually spawned the series, which began in April 2003 and is now in its fourth season. "I was playing the game all the time, and the inspiration for 'Red vs Blue' came from the game itself; I had spent so much time in the virtual world that it naturally sparked some creative thoughts which involved telling a story using the characters," recalls Burns. "It is fun giving life to something that I enjoy so much."

The crew's initial entry into filmmaking actually occurred while Burns and

Rooster Teeth Productions has created an Internet series set within the world of the popular video game *Halo*. Although it features the game's characters, the story-driven series contains unique scripts and situations that are not based on the game.

Hullum attended college at the University of Texas at Austin, where they wrote, directed, and starred in their live-action indie film called "The Schedule," about a regular guy named Jake (portrayed by Joel Heyman, now playing the character Caboose in "Red vs Blue") who collects souls for Death. With high hopes, the men also created a few live-action shorts and toured the film-festival circuit.

Achieving only limited filmmaking success, they were forced into various segments of the entertainment and technical job markets. And, like so many others, they were lured to the Internet. This was particularly true of Burns, who satisfied his quasi-filmmaking urges by making gameplay videos and posting them, along with reviews, on a computer gaming Web site, despite the fact that, of his own admission, no one watched them.

"From capturing the footage, though, I discovered that I could show a cool sequence if I edited the segments together," says Burns.

One day, Burns says, he decided to make a video showing how great he was at playing *Halo*, his favorite hobby. As inconsequential questions about the

game began to pop into his head—such as why a certain military vehicle is called a Warthog when it looks more like a puma—a novel idea surfaced. Why not create a movie from a video game that would address those issues. At first, Burns's friends were not ready to embrace this concept, but a call from a gaming publication requesting some of the old gameplay videos reignited the idea. And, eventually, Rooster Teeth was formed, and "Red vs Blue" was born.

Seeing Red...and Blue

Creating five minutes of animation a week on a continual basis is no easy task for a five-person studio like Rooster Teeth, or one much larger for that matter. According to Burns, the only way his group is able to accomplish that ambitious task is through machinima. To this end, the team uses *Halo* as a kind of stage set, albeit virtual, where each mini-movie is "filmed."

Before shooting begins, however, the team formulates a game plan. So on Sundays and Mondays, the Austin-based filmmakers assume the roles of scriptwriters, creating a story and crafting comedic, often absurd lines for the series' quirky, sarcastic cast of characters. Burns describes the series as an existential comedy, as the characters constantly analyze their predicament. As Burns notes: "These are not the greatest military minds of the future. Yet, the characters express the feelings of many real battle-weary soldiers."

Subsequently, on Mondays and Tuesdays, the group does the voice acting using a cast of 12 actors, many with main roles on the production team. "Being a small facil-

ity and this being a small, independent production, we have a lot of slashes in our job titles, like actor/producer/animator," says Burns, whose duties include voicing Private Church, one of the leaders of the Blue Team. By using Adobe Systems' Audition, the group is able to achieve the filtered voice effect that makes the characters sound as if they are speaking through microphones inside their helmets, similar to the tone of the *Halo* characters in the game.

Also on Tuesdays is when the audio editing is done, so that on Wednesdays, the filmmakers have in their possession what is akin to a radio play—a full audio file of the episode but no visuals to accompany it. So, Thursdays and Fridays are spent filming inside *Halo*.



In "Red vs Blue," the opposing sides—the Red Team and the Blue Team—are always analyzing their unusual predicament with humorous dialog.

Gameplay

To acquire the visuals, four Xboxs are linked on a network. One of the Xboxs, though, is routed directly into a homegrown dual-Pentium PC, where the video footage of the gameplay is captured in real time through Adobe's Premiere, and later, is edited in Premiere as well.

With one Xbox, the group captures the imagery that one of the characters is "seeing," and on the other three consoles, as many as 12 characters are displayed and captured. According to Burns, the capture process is not that different from actually playing the game. "It's just that we are not running around shooting one another," he says. "Instead, we're running around and yelling crazy dialog at one another." In fact, exchanging sharpshooting for sharp dialog is the biggest difference between the game and the series: Whereas *Halo* relies on its extreme action to drive the game's story, "Red vs Blue" relies on simplistic but engaging conversations to keep its story flowing.

Indeed, action sequences would be easier to film; that is what the game is designed to deliver. Far more difficult, though, is capturing snippets of personal interaction among the characters in

order to deliver a performance. "Plus, we have to match eye lines; the characters have to face each

Rooster Teeth uses Adobe's Premiere software to capture and then edit video footage of gameplay that fulfills the needs of its Webisode script each week.



Whenever possible, the filmmakers utilize objects, characters, and animations acquired directly from *Halo*, including this large turbine, which is from the game's Zanzibar map.

other as they talk and express themselves. That's true of 90 percent of our shots," Burns points out.

To deliver these animations, the group maneuvers through the game and performs actions that are needed to fulfill the dialog requirements—a process that, on average, takes about 15 to 20 hours weekly. Burns offers this analogy to describe the task: "We are using the video game characters like puppets that we manipulate and then record in real time. But instead of pulling strings, we use a video game controller to move them through space."

Because *Halo* is set within a finite world, Rooster Teeth must write its script to adhere to those limitations, which Burns knows all too well from his untold hours of gameplay. (Starting with Episode 43, the team began using *Halo 2* for its video source.) Still, those limitations pressured the Rooster Teeth staff to get creative with some of its shots—for example, placing game char-

MAKING MACHINIMA

What is machinima? By definition, it means machine cinema, or machine animation.

As a film genre, the term refers to animated movies produced with tools (cameras, level editor, game engine) and resources (backgrounds, characters, props, textures) available in a computer game. As an application, it is an example of emergent gameplay—putting game tools to unexpected ends through artistic modification.

Foremost, machinima is a creative tool. Although used to produce 3D animations in real time, the technique is closer in concept to live-action filmmaking than it is to animation. That's because the "director" utilizes traditional moviemaking techniques, controlling the actors, or characters, in real time, only within a virtual environment. "You make sure they hit a specific mark, deliver a certain line. You even rehearse a scene and do takes, which doesn't occur in traditional animation," says Mike "Burnie" Burns, one of

the founders of Rooster Teeth Productions, which creates machinima.

As a result of using this technique, productions tend to be less expensive and much faster than if traditional keyframing animations were used.

The earliest roots of machinima formed in the late 1970s and early 1980s, when programmers created short segments that were animated in real time. In 1992, the game *Stunt Island* boosted the concept by allowing players to create movies by placing props and cameras into scenes and splicing together takes. Another push happened a year later, when *Doom* included support for the recording and playback of gameplay. Soon after, the introduction of true-3D games, such as *Quake* and *MechWarrior 2*, with controllable cameras, created another big surge.

Today, makers of machinima tend to use *Quake 2*, *Unreal Tournament*, and *Battlefield 1942* for their craft. In fact, Epic Games, developers of *Unreal*

Tournament 2003, included a tool called Matinee, and sponsored a machinima film contest for those using the software. Moreover, Electronic Arts supports the capability in many of its newer titles, including *The Sims 2*, through a built-in moviemaking feature, and the *FIFA*, *NHL*, and *NFL* sports series, through instant replay, customizable camera angles, playback options, and more.

Although most often used for films, machinima extends to other forms of entertainment, including theater. The improvisational comedy group ILL Clan uses the technique to voice and puppet their characters, which are displayed on a large screen to a live audience.

One of the most popular and best-known examples of machinima is the Internet series "Red vs Blue," made by Rooster Teeth using the *Halo* games running on an Xbox. The mini-movies even inspired a fan tribute series called "Sponsors vs. Freeloaders," based in the forums of "Red vs Blue." —KM

acters on top of another's shoulders so that the "cameraman" character can obtain a high-angle crane shot.

Whenever possible, the filmmakers also acquire background sound, such as explosions, for use in the series. On occasion, they will augment the narrative with unique sound effects created and inserted into the movies with Audition, part of Adobe's Video Collection suite.

After the filmmakers assemble the audio and video for an episode within Premiere, they letterbox the video to hide the game information (including the scores and the weapon icon) at the bottom of the screen. "That makes it look more like a movie rather than a game," Burns notes.

One-Stop Shop

Of course, "Red vs Blue" would not have been possible without the blessings of Microsoft and Bungie, a developer known for supporting its huge gamer community. And, like all things *Halo*, the series immediately drew a large following, particularly among the game's loyal fan base. In turn, this presented Rooster Teeth with its biggest technical challenge to date: serving the video files to everyone who wanted to download them.

"Our servers were getting hit hard, and we had to expand quickly," says Burns. "When you have approximately a half-million viewers downloading a 30MB file, you have to do a lot of

calculations to figure out how to serve that much data at once."

Now, four seasons later, Rooster Teeth is serving up the episodes with little problem. All told, it has produced more than 60 "Red vs Blue" episodes and over a dozen videos of its other Web series, "The Strangerhood," based on *The Sims 2* game. Perhaps because of the synergy between the two series, "Red vs Blue" now has significantly expanded its following beyond the hal-
lowed *Halo* domain.

The episodes can be downloaded as QuickTime, AVI, or WMV files from www.redvsblue.com. In addition, each season (19 episodes plus many unreleased videos) is available for purchase on a DVD made by Rooster Teeth using Adobe's Encore during "hiatus" from filming. As Burns points out, by using the Adobe tools, he and his colleagues were able to bypass the distribution obstacle faced by many independent filmmakers. Today's accessible hardware and software, along with the Internet, has led to a new business model for filmmakers, he says, allowing them to take a concept, produce it, and distribute it on their own.

"All the things we tried to make happen on the live-action film side years before are now coming true with 'Red vs Blue' in regard to film festivals and other types of successes," notes Burns. (The Web series has received awards for Best Picture and Best Writing for machinima. It is also being shown in theaters in the US, Australia, Germany, England, and France, and the company was invited to show an episode at the Sundance Film Festival this past January.)

So, after years of playing *Halo* for pleasure, now followed by at least 20 hours a week of work-related gameplay, has Burns grown tired of the title? Not on your life, or that of Master Chief. "I still play it all the time. In fact, Bungie just recently released a new series of maps," he says enthusiastically, just like any true-blue (and red) *Halo* fan would. ■

Karen Moltenbrey is an executive editor for Computer Graphics World.



With the filmmaking technique known as machinima—which uses gameplay imagery and animations, such as these acquired from *Halo*—a small studio can achieve the impossible: five minutes of CG animation on a weekly basis. And, in the process, a new form of entertainment is born.



RISE OF MACHINIMA

The online encyclopedia "Wikipedia" credits Rooster Teeth Production's "Red vs Blue" with giving new direction to machinima. Prior to the series, machinima works tended to be lengthy, singular pieces; however, since the beginning of "Red vs Blue," most new machinima releases have been episodic. In addition, the series has established a commercial market for the art form through DVD sales.

While "Red vs Blue" has been a poster child of sorts for the genre, it was not until the series grew in popularity that the Rooster Teeth discovered its novel filmmaking process actually had a name and others were using the technique as well.

That's hardly surprising considering machinima's appeal, particularly its low cost in terms of hardware and software requirements: a leading 3D game title costs approximately \$50, whereas professional 3D modeling and animation software can run \$3000 or more. Additionally, the genre requires less production time because of its real-time rendering, which doesn't require a renderfarm.

However, for reasons unknown, the number of machinima artists, or filmmakers, remains relatively small, despite the increase in available tools. Yet, as the next-gen games become that much more photorealistic, the gap will narrow between the quality of the visual effects in Hollywood movies and the real-time graphics that appear in games. This should broaden machinima's appeal as a filmmaking technique and as a previsualization tool for storyboarding and visual effects planning.

"Machinima is changing the way people think about CG animation and how it's done," says Mike "Burnie" Burns, one of the founders of Rooster Teeth. "After we have some models and basic animation routines, we can produce five minutes of animation a week with only five people, whereas five minutes of a Pixar film would take far longer with a much larger staff." While Burns quickly acknowledges the differences in production quality between a machinima movie and a Pixar release, he points out that the gap is narrowing more each day. —KM

Take One!

Psyop employs a holistic approach to animation using simultaneous full-body and facial mocap

By Karen Moltenbrey

Two motion-capture sessions are not necessarily better than one, particularly when it comes to recording both the subtle movements of the face and the larger, more expansive actions of the head and body for a single performance.

Until recently, studios had no choice but to mocap these actions in separate sessions using different setups, and hope they matched up aesthetically. However, with advancements in motion-capture technology, it is now possible to simultaneously record both the intricate expressiveness of an actor and the person's extensive full-body movements. As a result, the expressions and actions elicited by the actor can be recorded accurately for a comprehensive performance that is more holistic and complete, and easier to direct.

Using Vicor MX40 cameras, the crew at House of Moves acquired the facial and full-body motions of actresses during the same single mocap session. Later, 3D artists at Psyop applied those realistic movements to highly stylized digital characters who star in a series of four TV spots.

Ideal for film and computer game animations, the technology has quickly found its way to the broadcast realm. Some of the first TV commercials to utilize the simultaneous motion capture were from design collective Psyop, in conjunction with advertising agency DDB Chicago and House of Moves mocap studio, for McDonald's Fruit 'N Walnut campaign. Psyop created the four spots, which blend equal portions of reality and animation, each rendered in cartoon-like colors and simple line drawings, yet featuring characters who move and speak in a realistic fashion.

"DDB initially came to us with several scripts," says Justin Booth-Clibborn, executive producer at Psyop. "The group wanted lots of talkative description about the salad, but also wanted very stylized characters and environments. For the characters in particular, DDB wanted them animated in a realistic way, but not photorealistic in their appearance. The agency asked us to replicate the expressions and emotions of



Mocap photos courtesy House of Moves. Images courtesy Psyop.



the characters while keeping them artistic.”

And, according to Booth-Clibborn, that balance presented both a creative and technical challenge.

First, real actors taped their lines at a recording studio, and brought a copy of the recording to the mocap session for use as a reference. At House of Moves, the actors then lip-synched their parts as they performed the required actions. Within a 10x15-foot capture area, technicians recorded the movements of the actors’ faces, hands, and bodies, using a 32-camera Vicon MX40 optical motion-capture array.

Toward one end of the capture volume was a more facially oriented setup with additional cameras for higher data resolution.

Later, artists at Psyop applied the mocap information to CG character models. “In the past, everyone expected a person to make the right facial gestures based on a full-body performance the actor did the day before, and no one ever duplicates those actions exactly,” says Tom Tolles, House of Moves’ CEO. “In this instance, the actions matched because they were performed at the same time.”

For the McDonald’s campaign, the mocap crew not only captured the whole performance of one actor, but did so as well for a second person whose digital double likewise appears in each scene. This meant that the pair’s interactions with each other also were acquired at the same time, making the performances extremely accurate.

Yet, processing and delivering such a large amount of data is particularly challenging. To accomplish this task, the crew employed Vicon’s IQ software and House of Moves’ Diva program, and then delivered the motion files to Psyop.



Simultaneous mocap let technicians record a total performance that accurately portrayed the interactions between the actors (left) so they could be applied to CG characters (right).



“In addition to the directive that the spots be realistic yet stylistic, the scripts were fairly dialog-heavy,” explains Psyop’s Todd Akita, one of the spot’s technical directors. “So we had to think about how we could do so much facial work in such a short time frame. By using simultaneous full-body and facial motion capture, the director could watch the actors in real time and sculpt their performances on set, rather than waiting days for us to animate the characters by hand. With keyframing, sometimes you get the performance the director wants, and sometimes you don’t.”

Akita estimates that the group, overall, saved nearly a week’s time by using the new mocap process. However, he is quick to point out that a timesavings is difficult to ascertain because the artists may never know how close or how far away they might have been in meeting the director’s expectations. “But with motion capture, you are guaranteed that the overall structure of the performance—the broad gesturing, emphatic points—are there,” he says. “Getting that basic idea is the most difficult part. From there, it’s a matter of adding keyframes to augment and finesse the performance.”

Although the animation data was ex-

tremely accurate and realistic, the design of the characters was quite the opposite—per the client’s request. According to Akita, the art team worked with a fashion illustrator to come up with the visually appealing, highly stylized design.

Then, the Psyop team translated those images into 3D, building the CG models in Softimage’s XSI and texturing them in Adobe’s Photoshop. Yet, the models—because of their stylized appearance and the fact that they were initially designed in 2D—did not project the same physiology as the actors who were motion-captured. This was particularly true of the facial area. As a result, the Psyop artists had to develop a method for warping and sculpting the animation so it would conform to the dissimilar shapes.

Later, the team rendered the final frames with XSI’s Toon Shader. However, the key to the spot’s distinctive design was in the compositing methodology, accomplished with Adobe’s After Effects and Autodesk Media and Entertainment’s Discreet Flame.

According to Akita, the group broke up the rendered image into subtle islands of color, similar to a lithographic process, whereby each of those islands were individually adjusted to create a slight offset effect. “We did many passes to achieve the final look,” he notes.

Without question, the work Psyop did in the McDonald’s campaign illustrates what can be achieved when characters, even those in TV commercials, are given a heavy dose of reality. ::

Karen Moltenbrey is an executive editor for Computer Graphics World.



Portfolio



© 2000 Laurence Gartel.



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Clockwise from top left:

Mozaic Lady Land (2000) This ink jet print, part of the "Cuzin Series," was created on an IBM IntelliStation using Painter.

Clown Cuzin (2000) An ink jet print, this collage was made in Painter and Photoshop running on an IntelliStation. It was exhibited at the Edison College Gallery of Art in Fort Myers, Florida.

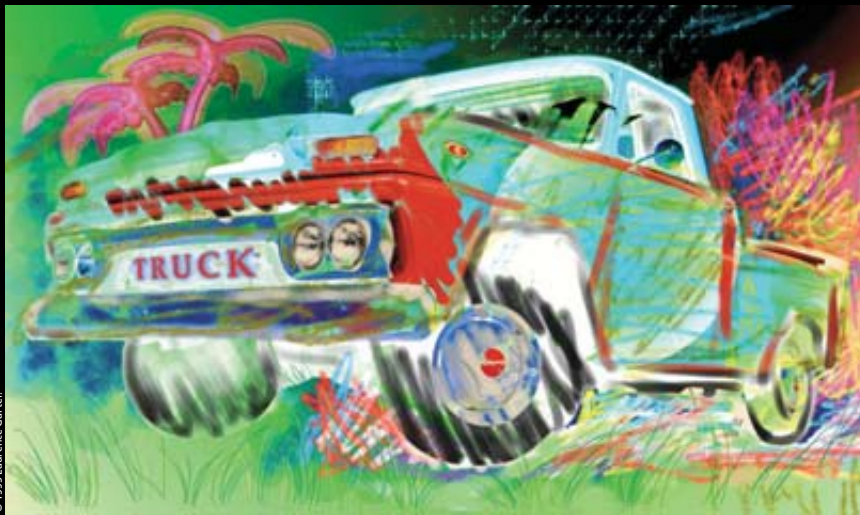
India (2005) Created on an iMac G4 running Painter, this print was produced as part of the upcoming DVD titled *Gartel: India*.

Double Disguise (1989) This R Type print selection, which was created on a Commodore Amiga, was first exhibited at the Joan Whitney Payson Museum of Art in Portland, Maine, as part of the "Nuvo Japonica Series."

Laurence Gartel of Boca Raton, Florida, is regarded as the father of the digital art movement, and for the past 30 years, his works have been exhibited in a number of museums.

Gartel graduated from the New York School of Visual Arts with fellow student (now renowned graffiti-style artist) Keith Haring. Soon after, he started his electronic career working alongside Korean artist Nam June Paik at Media Study/Buffalo, an electronic art center where people were beginning to manipulate images, which were broken down into gray-scale values. "I wanted to capture an image off a monitor," Gartel recalls of his early ambition. "I believed that electronic art should hang on a wall like a painting."

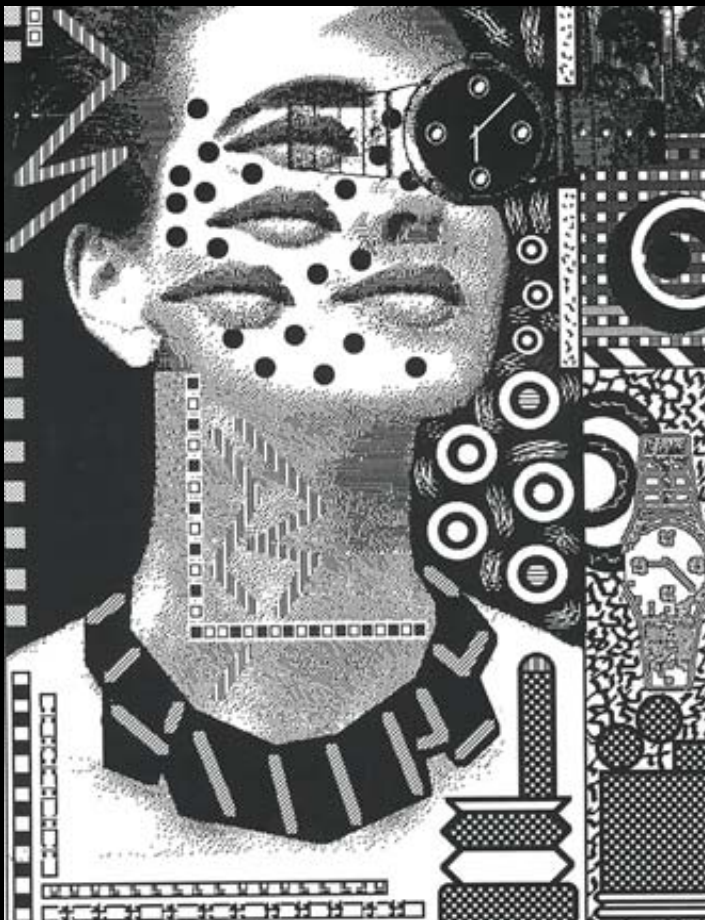
Gartel began experimenting with tools and techniques, which led to his "trademark" style of autobiographical digital collage that mixes painting and photo manipulation with



© 1995 Laurence Gartel



© 1987 Laurence Gartel



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© 1991 Laurence Gartel

storytelling. The images he uses vary in resolution, texture, and surface, and are of people and experiences from his life. Anyone can do a collage today in Photoshop or some other program, but I did it decades ago prior to the availability of commercial painting and photo-manipulation software, he points out. Today, Gartel uses a range of tools for his artistic endeavors: Illustrator, Painter, Photoshop, Amorphium, Bryce, and Poser/Shade.

Currently, the artist is working on a number of ventures, including a multimedia project, a talk show, and more.

A selection of Gartel's images is featured on these pages. A more extensive look at both the artist and his works can be found on the *Computer Graphics World* Web site at www.cgw.com. —Karen Moltenbrey

Clockwise from top left:

GM TRUCK (1995) This ink jet print, created on an IntelliStation with Painter, was produced as part of Gartel's ongoing "automotive" focus.

Energy Men (1987) Created on a Commodore Amiga, this image was part of the artist's "Amiga Series," which took advantage of the personal computer's full-color imaging capability.

Dance of the Moonfairies (1991) Created on an Apple IIfx, this was the catalog and signature picture of Gartel's retrospective show at the Norton Museum of Art in West Palm Beach, Florida.

Lip Service (1986) This black-and-white print was created on the original Macintosh 512 with the first MacPaint software and a Thunderscan, a primitive scanning device.

Maya 7

Advanced modeling, effects, and animation tools inspire creativity

By George Maestri

Maya has certainly become the de facto standard in visual effects, and at animation studios throughout the world. The software has many advanced features and is always at the forefront of new technology. While Maya is very robust, it's sometimes a little rough around the edges. Version 7 of Maya softens those edges with new interface enhancements and advanced modeling tools. Alias also extends the package with nice new animation and effects features.

The software is available in two versions. Maya Complete has all of the modeling, animation, and rendering tools most artists will need, while Maya Unlimited adds advanced features such as hair, cloth, and fluid dynamics.

To test Maya 7, I used a workstation running Windows XP with an ATI FireGL board. Installation was straightforward, and once licensed, the software was up and running without any problems.

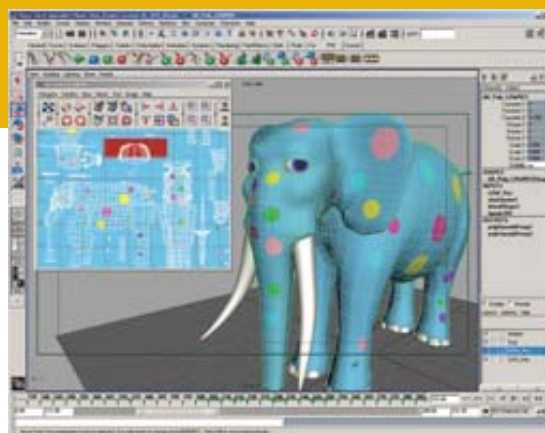
Maya 7's interface is recognizable, and the panels and basic menus are identical to those in previous versions. There are, however, a few key additions to Maya 7, such as the Universal Manipulator that surrounds a selection with a box-shaped manipulator. This allows you to move, rotate, and scale an object without changing modes. A new gizmo viewport allows you to instantly change the viewport's view to any angle. Yes, Maya now has easily accessible back, bottom, and right viewports.

Motion-graphics artists who work with

many Adobe Illustrator files will appreciate Maya's new import features. Now Illustrator files can be referenced, with the link to the original Illustrator file remaining "live." And, if the original file changes in any way, the changes are automatically reflected in the Maya file. This is a particularly nice feature for work groups, where a logo or other piece of art may undergo many revisions.

Maya's polygonal modeling tools have also been upgraded. The Select Edge Loop, Border, and Ring tools, for example, give you much more freedom when selecting and manipulating edges. Tools such as Duplicate Edge Loop allow you to add new detail to a model quickly. Vertex selection has also been improved by allowing you to use the arrow keys to expand the selection interactively.

Most artists who model with polygons also use subdivision surfaces, either with Maya's SubD surfaces or a simpler tool called Smooth Proxy. SubD surfaces in Maya are very robust, but require a lot of system overhead. Therefore, people with basic modeling needs usually opt for the faster Smooth Proxy method. Smooth Proxy users will also be happy with the Poly Crease tool, which allows you to weight the sharpness of a smoothed model's edges. This is nice for creating sharp corners in an otherwise smooth object. One feature I'd like to see added is the



Maya 7's UV mapping tools have been improved to make complex texture mapping much easier.

ability to weight vertices for greater control over the "pointiness" of corners.

Artists will also appreciate the new UV mapping tools, which make it easier to place textures on polygonal objects. The Unfold UVs tool gives Maya an easy way to "spread out" the mapping of a complex object on a flat plane and adjust it to fit a flat bitmap. The actual editing of UV maps is aided with some new marking menus that can be used to quickly switch between tools without digging into Maya's main menus. Other tools, such as UV Smear, also simplify UV mapping.

Animators will be happy with the incorporation of MotionBuilder's full-body IK system into Maya's skeletons. This system lets Inverse Kinematics (IK) affect the entire body rather than just the limbs of a character. For example, if you pulled the arms of a character using the full-body IK, the character would not only reach, but once the arms were extended, the character's body would also lean into the reach, creating more realistic movement.

While full-body IK works great, setting it up is not simple. New skeletons must be created manually in Maya using a specific naming scheme, which can become time-consuming. It is faster to create new skeletons in MotionBuilder and import them into Maya. Perhaps future versions of Maya will simplify this process with a menu or control panel that allow you to create a full-body IK skeleton interactively within Maya.

continued on page 34

Maya 7

Price: \$6999 for Maya Unlimited, \$1999 for Maya Complete

Minimum System Requirements:

Windows Intel Pentium III or higher, AMD Athlon processor; Macintosh Power Mac G4 and G5, Linux: Red Hat Linux 9.0 and Red Hat Enterprise Linux 3.0 WS or SUSE Linux 9.1; 512MB of RAM; a CD-ROM Drive; hardware-accelerated OpenGL graphics card, and 450MB of hard-disk space.

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RenderMan for Maya

Pixar interfaces with Maya for advanced rendering options

By George Maestri

continued from page 32

Another great rigging feature is the Geometry Substitution tool, which can be used to swap models on existing skeletons and have the skin deformations follow along. While this approach isn't perfect, it does a terrific first pass on the new model, reducing the work load to a simple testing and tweaking of the envelopes and deformations.

Hair and fur can now be rendered within Mental Ray and a new toon shader that relies heavily on Paint Effects technology has also been added. A toon-shaded object is actually "painted" on automatically, using Paint Effects' brush strokes. This approach gives you more control over the final result, but requires some additional overhead—each "stroke" of paint on an object creates an additional Paint Effects object in the scene.

Those who create lots of special effects will appreciate the new solver for Maya's fluid dynamics, which helps make the effects more realistic. Technical directors will also appreciate the ability to save and load hair presets, giving them the ability to make custom "hairstyles." To speed this process, Alias provides a couple of hairstyles with the software, which can be used as starting points for creating custom hair designs.

Overall, the new features of Maya 7 have definitely evolved, making the package more robust and user-friendly. There are enough new features in the latest version to satisfy everyone, and keep them on a steady upgrade path. I would like to see better integration of the full-body IK system and continued improvements in polygonal modeling tools in future versions. Still, Maya is certainly a venerable package with a complete feature set and a wealth of enhanced modeling and animation tools. ■■

George Maestri is president of Rubber Bug, a Los Angeles-based animation studio specializing in character animation.

Pixar's RenderMan for Maya software is a rendering and a programming environment designed to seamlessly integrate with Maya running on a Mac, Windows, or Linux system. Installation on a Windows XP workstation was easy, and RenderMan is accessed through the Maya plug-in manager.

The renderer itself is switched on using the Render Globals menu, which is where you choose between Maya's own renderers or Mental Ray; installing RenderMan simply gives you another option. Selecting RenderMan gives you a number of additional panels within Render Globals, where you can tweak the rendering quality, set up rendering passes, or turn on motion, blur, raytracing, and global illumination.

Rendering always starts with applying textures and creating shaders. A RenderMan shader is authored in Maya's Hypershade window, which is also where other Maya shaders are created. Most Maya materials and shaders are automatically converted to RenderMan, which helps simplify the learning curve. For advanced RenderMan features, such as subsurface scattering, you must go into the Hypergraph and attach the subsurface nodes directly to the object. One feature missing in RenderMan for Maya is the ability to author your own RIB shaders. This must still be accomplished with advanced tools such as Slim and MTOR, and requires an upgrade.

Standard Maya lights can be used, but

RenderMan also supports lighting models such as global illumination for softer, more realistic lighting. The Deep Shadows feature allows for higher-quality shadows, with support for advanced features, including object transparency and volumetric effects.

When testing shots rendered in Mental Ray and RenderMan, I noticed some subtle differences in the character of the renders. Reflections were quite nice, and the shading seemed a little softer than Maya's renderer. In some scenes, however, the power of the lights didn't quite match between the Maya renders and RenderMan, so I had to change the intensity.

RenderMan for Maya will also render Maya's proprietary features, such as its hair, fur, paint effects, and particles. Paint Effects offered great results. When I loaded a heavy Paint Effects scene that I had created previously, the render crashed. Perhaps the scene needed more than 4GB of RAM to render, but it should not have crashed the application. Suffice to say, this is a 1.0 release, and there will be a few minor glitches.

Advanced features such as subsurface scattering and global illumination were also tested and produced realistic effects. Overall I really like rendering to RenderMan. Not only does it produce great-quality images, but it also gives artists easier and more affordable access to RenderMan rendering. I think RenderMan for Maya will find a wide audience that will take this robust renderer into a whole new level of studios. ■■

RenderMan

stats

Price: \$995

Minimum System Requirements:

Apple Mac OS X Version 10.3.1 (or higher), Linux 32-bit (2.2, 2.3), Linux 64-bit (2.3), or Windows XP Pro, 2000 Pro (Service Pack 2 or later).

Pixar

www.pixar.com

products

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SOFTWARE

VISUAL EFFECTS

No Streaking Here

Win • Mac RE:Vision Effects has improved its Twixtor 4.5 timing software and ReelSmart Motion Blur software for Avid systems offering greater control of timing and motion. Twixtor 4.5 has been rewritten to allow for more accurate tracking of objects, resulting in fewer artifacts as images cross onscreen. A smart blending method for pans and zooms helps eliminate unwanted streaks and artifacts at frame borders, and a new option has been included to enhance dark images and images with poorly defined edges. ReelSmart Motion Blur 3.0 for Avid systems incorporates Twixtor 4.5 technology and is designed to add and remove motion



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blur based on per-pixel calculated motion. Now available, Twixtor 4.5 and ReelSmart Motion Blur 3.0 are compatible with Windows and Macintosh versions of Avid Xpress Pro and Adrenaline 1.8.

RE:Vision Effects; www.revisionfx.com

TRAINING

XSI Training Made Easy

Win Digital Tutors has unveiled Fundamentals of Soft and Rigid Bodies in XSI and Fundamentals of Mental Ray in XSI training kits for Softimage XSI 5.0. Offering up to 2.5 hours of project-driven training and guides, along with a free trial version of Softimage XSI 5.0 Foundation, the kits include step-by-step instructions and hands-on tutorials. The Soft and Rigid Bodies kit covers setting up rigid-body simulations with active and passive rigid bod-



ies, forces and environments using ODE and physX rigid-body engines, converting simulations to animations, soft-body simulations from objects and clusters, and more. The Mental Ray kit covers topics such as global illumination, final gathering, controlling photon emission, optimizing render speed, HDR lighting, caustics through glass, and more. Both kits are available now for Windows and priced at \$55.99 each.

Digital Tutors; www.digitaltutors.com

3D MODELING

Unleash the NURBS

Win Npower Software has released Power NURBS 1.0, an innovative hybrid modeling system that brings surfacing, solids modeling, analysis, and tessellation to Autodesk Media and Entertainment's 3ds Max and Viz software programs. Power NURBS boasts features such as Booleans, shelling and variable radius filleting, high-continuity blending, multi-rail sweeps, and high-continuity Class-A surfaces. A hybrid modeling paradigm offers the flexibility necessary to create complex concepts and surfacing algorithms that the company claims meet the exacting standards of the automotive and aerospace industries. Intelligent objects are designed to retain their parameters and update automatically through design revisions,

and a solids model file can quickly be transformed into a physical object using rapid prototyping and 3D printing techniques. Power NURBS is available now for Windows and is priced at \$995.

Npower; www.npowersoftware.com



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JANUARY

9-13

Macworld Expo 2006, held in San Francisco. Contact www.macworldexpo.com.

19-29

Sundance Film Festival, held in Park City, Utah. Contact Sundance Institute, 801-326-2000, FestivalRegistration@sundance.org, www.sundance.org.

DV, SD, HD, and 2k and 4k film formats for the broadcast and postproduction markets. The Ciprico DiMeda 10G NAS system—targeted at DV, SD, and lower-resolution HD nonlinear video applications—boasts 12TB of raw storage capacity, sustained performance of 300MB/sec, and a 10GB Ethernet connection. The new MediaVault 4110, designed for postproduction and digital intermediate applications, combines a 4GB Fibre Channel interface with ATA drives. A single device records and plays back multiple streams of uncompressed SD and HD, whereas two 4110s striped together offer nearly 600MB/sec sustained throughput for dual-stream HD. Moreover, multiple 4110s support the recording and playback of 4k uncompressed film. Now available, MediaVault 4110 is compatible with popular video-editing software and video capture/playback on Windows, Mac, Linux, and Unix hardware.

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A Both. Tim Burton's source material contains the absolute essence of this place and these people. We did have total freedom in so far as we would have to capture that essence. The hardest thing to do is improve on that first sketch, so creative freedom is relative.

Q *Is the art direction different in the game compared to the movie?*

A The biggest challenge was holding back. Because you have the ability to do *anything*, the tendency is to do just that. However, there is a danger of making everything a dessert instead of a three-course meal. Good ideas and strong visuals should be enjoyed, and not diluted by an oversaturation of effects and a multi-layered production value. Less is more.

Q *What was the biggest technical challenge you faced in art-directing the game?*

A For me, it was understanding that a pixel is a unit of measurement and occupies a real space. It's no different to an animator getting his or her head around the fact that one-twenty-fourth of a second is a unit of time. I had to stop myself from looking for "real" things.

Q *Did you "update" the property's look for today's audience?*

A I don't think that the look was necessarily updated as much as it was expanded upon. I've heard arguments about more sophistication, more exposure to cool things, and so on, but, fundamentally, I don't think that today's audience is any different from any other audience—contrary to what the audience would like to believe.

Q *How would you describe the style of art for the property, and how is it different from other CG films and games?*

A The look is Gothic noir—somewhere between the worlds of the Grimm brothers and Dr. Seuss. In a nutshell, it is all things Tim Burton. I'm not sure how it differs from other games. I would point out, though, that there was a conscious effort to bring a cinematic feel to *Oogie's Revenge*, not in the sense of an action blockbuster, but more in the sense of its aesthetics and its charm.

Q *What is your favorite new environment in the world of Oogie's Revenge?*

A I couldn't really say. Because it's so new to me, I still enjoy all of it equally right now. With the movie, it took me about six years to decide that I liked Lock, Shock, and Barrel's tree house interiors the best, and then, recently, I decided I liked Town



Hall more. It's like opening up a *Far Side* book; you find a new favorite every time. One thing about the new locations is they all have an actual history, or backstory behind their creation. You won't see it, but you will feel it. In order to design *what* it is, you need to design *why* it is.

Q *After more than 10 years since the release of Nightmare, are you surprised that it still seems to be finding new audiences?*

A This is a constant surprise to me, but at the same time, I can understand it. The film is

unique in its feel, and it is seamlessly directed. In a sea of animated films that differ from one another by such minute increments, it has to stand out.

Q *How long did you work on the game?*

A My involvement spanned a 12- to 18-month period, and I typically made a pass over the work from my home in South Australia before it hit the build stage. All the work was coordinated through Buena Vista Games in Los Angeles to Capcom in Japan, passing in front of Tim Burton in London at the appropriate times. When we felt we had the right framework, I went to Japan and worked directly with the crew for a brief period.

Q *Is there a Deane Taylor character in the movie or in the game?*

A In the movie, in one of the Halloweentown wide shots, there is a small Dr. Death character off to one side in the shadows. Basically, we had a hole to fill in order to imply a larger crowd, but no puppets to do it with. [The character's] a bit of old sack, draped over a plastic coffee cup and holding a sad-looking scythe. This is the guy I identify with the most, though I don't know why. I do appear as a doodle on a police officer's pad when things go to bits at the end of the film, but this resulted from an art department in-joke. As far as the game goes, I am not aware of any alter ego.

Q *Do you have any departing words concerning your experience as an artist?*

A The most important thing is to respect the talents of those you work with and to have the confidence in your own work so you can stretch yourself creatively. This is what is most important when it comes to getting right under an idea and pushing it to a new height. Without this process of inspiration and challenge, your work can only ever be ordinary. ##

backdrop

Interview by executive editor
Karen Moltenbrey

Recurring Nightmare

Deane Taylor adapts his visual style from *The Nightmare Before Christmas* for the interactive CG world of computer gaming

*As Hollywood continues to embrace the computer game industry, film artists are looking at new ways to express their creative genius with interactive technology. In 1993, legendary filmmaker Tim Burton released his stop-motion movie *The Nightmare Before Christmas*, which quickly became a cult classic, and is still popular today. A decade later, Burton and the film's art director, Deane Taylor, reinvented the movie in an interactive form for the PlayStation 2, Xbox, and Game Boy Advance. Published by Buena Vista Games, *The Nightmare Before Christmas: Oogie's Revenge* is available now.*

Q *When did you begin your career in animation?*

A Years ago, I was the host for a children's television show in South Australia, and while there, I had the opportunity to interview the late, great Bill Hanna from Hanna-Barbera in Los Angeles. He offered me a job in his Sydney studio as the layout artist on *Popeye*, *The Flintstones*, and other popular titles at the time. That was in 1978, and I've been working in animation ever since, performing a variety of roles ranging from art direction through production design and direction on feature films, TV series, and commercials throughout Australia, Asia, Europe, and the US.

Q *How did you find your way into film?*

A While working for Hanna-Barbera, I got to know a network of animators, and we would fax cartoons and sketches to one another based on whatever seemed funny that day. One day, director Henry Selick spotted some of those sketches and thought I might be a good choice as the art director for *The Nightmare Before Christmas*.

Q *Did the unique look of *Nightmare* influence your artistic designs for the film?*

A Apart from the obvious duties of an art director, I helped flesh out a 2D visual approach in a 3D environment, which gave the film a bit of a 'stamp.' In order to support this, all the artists had to understand set construction and lighting, as well as design and conceptualization. It was important to appreciate the physical constraints of a set, a prop, or the ability to get a light in there, in order to twist and deform these worlds in a believable way.

Q *How did your approach differ for the computer game *Oogie's Revenge*, which is based on the film?*

A The game production was inherently different from the film production. Even though the basic mold was created for the film, it was not a simple task of popping out another [version of the property]. To begin with, you had to assimilate reality to make it match the flavor of the film, then you had to twist it back out again—like reheating a steak. This was a difficult sensibility to achieve, and one that the crew at Capcom



Art director **Deane Taylor** created the concept art for the new computer game *The Nightmare Before Christmas: Oogie's Revenge*, based on director Tim Burton's film *The Nightmare Before Christmas*, whose visual style Taylor also developed.

in Japan did well. And while the challenge was different, the responsibility to the end product was the same.

Q *Have you worked on games in the past, or was this your first experience?*

A I've done about a gnat's whisker amount of game work, and yes, I have big plans for future game development. For me, it is a new form of storytelling, and a way to execute an extremely adventurous design that might otherwise not be possible.

Q *In what way was designing for the game's 3D environment different from that of the stop-motion film?*

A The biggest difference was the freedom of scale and the atmospheric elements of the CGI—if you need the graveyard to be 10 miles wide, you can do it without having to extend the set out the door and into the alley, as you would with stop motion. As far as the planning goes, every last detail had to be storyboarded for the film. While that is not true of the game, I don't believe that any preproduction shortcuts were made. In fact, the planning needs, in many ways, were much greater.

Q *How much freedom were you given to create new environments and characters? Or, did you feel a certain loyalty to the source material?*

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