

Enabling 3D Moviemaking: Autodesk® Retools Maya®

BY LEE PURCELL

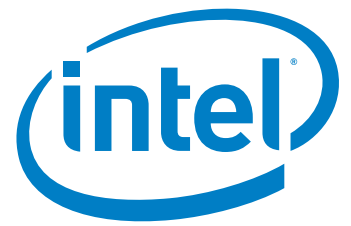


Image courtesy of DreamWorks Animation SKG

Stereoscopic moviemaking is on the rise and coming to a screen near you. That screen may not necessarily be limited to the silver screen of your local movie theater, but—given the technological advances underway—it could be your computer screen or even your television screen. The developers at Autodesk who have just released Maya® 2009 have clearly seen the writing on the wall and have generously equipped the latest version of their 3D design and animation software with features and capabilities to support stereoscopic 3D digital content creation. Put on your 3D glasses and let the show begin.

Successes in 3D Entertainment

The short-lived 3D phenomenon in the 1950s, which had audiences bobbing and weaving in their theater seats as films had objects flying from the screen and monsters reaching out at moviegoers, hinted at the possibilities of adding depth to movie viewing. However, the cheesy cardboard 3D glasses and primitive film techniques were just as likely to induce a headache as to enhance the entertainment experience. After a spate of films, the novelty largely wore off and 3D faded from the scene.

Today, however, a number of factors are driving a renaissance in 3D stereoscopic films. Sophisticated

digital cinema camera systems enhance image capture and improve quality. Highly integrated digital workflow techniques simplify stereoscopic content creation. Many-core processing platforms—led by advances pioneered at Intel—power through the tremendous volumes of digital images involved in the production process. And, significantly, strong growth and investment by theater chains in digital cinemas and 3D-capable digital projectors, demonstrates the commitment to the future of 3D stereoscopic films.

Successful animated works such as *Beowulf* highlighted the strong draw of 3D to audiences, generating greater box-office receipts than simultaneously released 2D versions. Encouraged by this success and buoyed by the supporting technologies that cut costs and improve results, many moviemakers are launching projects in the 3D realm.

Autodesk has made a strong bid to provide the tools to enable an emerging generation of 3D moviemakers. Kevin Tureski, product director at Autodesk, said in an exclusive interview with *Intel® Visual Adrenaline*, "One of the things that we've been doing is working very closely with the leading studios in stereoscopy. And, of course, that includes Sony Picture Image Corps, and *Beowulf*, Disney Animation with *Meet the Robinsons*,



and *Chicken Little*. Also, absolutely, DreamWorks Animation—as they have made a very significant commitment to stereoscopy.”

“The quality of the content of stereoscopic productions will very much depend on the filmmakers,” said Sebastian Sylwan, senior industry manager for film at Autodesk. “I think one of the main drivers,” he continued, “is giving our customers what they need to make the best production possible. All the enabling technologies—and the current resurgence of stereo filmmaking—are really driven by a particular alignment of knowledge: knowledge about digital cinema, single projector stereo, digital projection techniques. So many of the technical hurdles that were in the previous iterations of projecting stereo and creating stereo (as well as obstacles with digital cameras) are being intrinsically solved by these technologies.”

Efforts coordinated by industry groups, including the Digital Cinema Initiatives LLC (www.dcinovies.com), are paving the way toward wider distribution of 3D content. On the home front, Intel is actively

working with companies, including DreamWorks Animation SKG, to bring premium stereoscopic entertainment to audiences through big screens in the movie theater and computer screens in the home. Another venue where 3D continues to gain momentum is computer gaming, in which immersive worlds acquire an extra measure of reality with the addition of stereoscopic depth.

Strengthening Workflow with High-Performance Platforms

Through close collaboration with Intel, Autodesk developers have tuned their product performance to the platform capabilities of multiple processing cores, multi-threading many of the most demanding, data-intensive tasks (of which there are many in the stereoscopic 3D pipeline). Supporting two separate streams of digital image data to support the stereoscopic model clearly requires a truckload of processing power. Intel and Autodesk found many areas where Maya’s 10-million lines of code could be refined to take advantage of parallelism.

“One of the things that has been great—now that Maya is part of

Autodesk—is that we can take a pipeline-wide view of stereoscopy. Instead of just providing a point solution in a single product, we’ve taken a very holistic, product-line, wide view toward stereoscopy. We made sure that data Maya creates can be taken into Toxik*, our 3D compositing system.”

“So there’s a real nice seamless workflow, if you’re dealing with stereoscopy” Tureski explained, “between your 3D package, your compositor, and even our color grader, Lustre*. We made sure to add stereoscopic capability to all of those products, so that again, when you’re working in stereo you’re not just working in 3D. You’re not just compositing. You’re not just color grading. Being able to carry stereoscopy data between all those products is required when you’re working with that level of complexity in this medium.”

Phil McNally, the global stereoscopic FX supervisor of DreamWorks Animation, said, “Using Maya, we have developed a 3D toolset and workflow that gives our artists a highly interactive

“Stereoscopic 3D is the next big innovation for the movie industry. It is changing the way films are created, presented and ultimately experienced by audiences.”

Jeffrey Katzenberg, CEO, DreamWorks Animation

environment for working in stereo. Using the various 3D display systems at DreamWorks, artists are able to view in stereo throughout the production pipeline.”

“In Maya,” McNally continued, “we can interactively control the 3D effect and see these changes happen in real-time. We can quickly adjust the scene composition and even adjust a character to be in front of the screen or behind the screen—all in a highly interactive environment. The example would be something like: if you’re a sculptor working in clay, now we have our hands on the clay as opposed to being in some remote room writing up parameters of what we want the clay to be like.”

The prevailing trend in today’s animation pipelines—which are undergoing rapid evolution in the industry-leading studios—is to integrate processes throughout the pipeline for more fluid workflow and greater visualization possibilities. Performing complex operations concurrently helps speed overall workflow performance. Advanced multi-core processing architectures, as provided by Intel® Core™ i7 processors (code named Nehalem), enable the performance-driven platform capabilities that are revolutionizing digital cinema production techniques.

“In the past,” McNally explained, “what you were trying to do is take the idea of the storyboard and create an animated version of that storyboard, which supports the same compositional idea. The choices include which lens to use and what’s the actual framing of the shot going to be. That’s a very two-dimensional workflow—based on drawn images in a two-dimensional view. Even though we’re in a 3D world, it’s still a two-dimensional view of that world. What we’re trying to encourage now is different. Although the storyboard is still

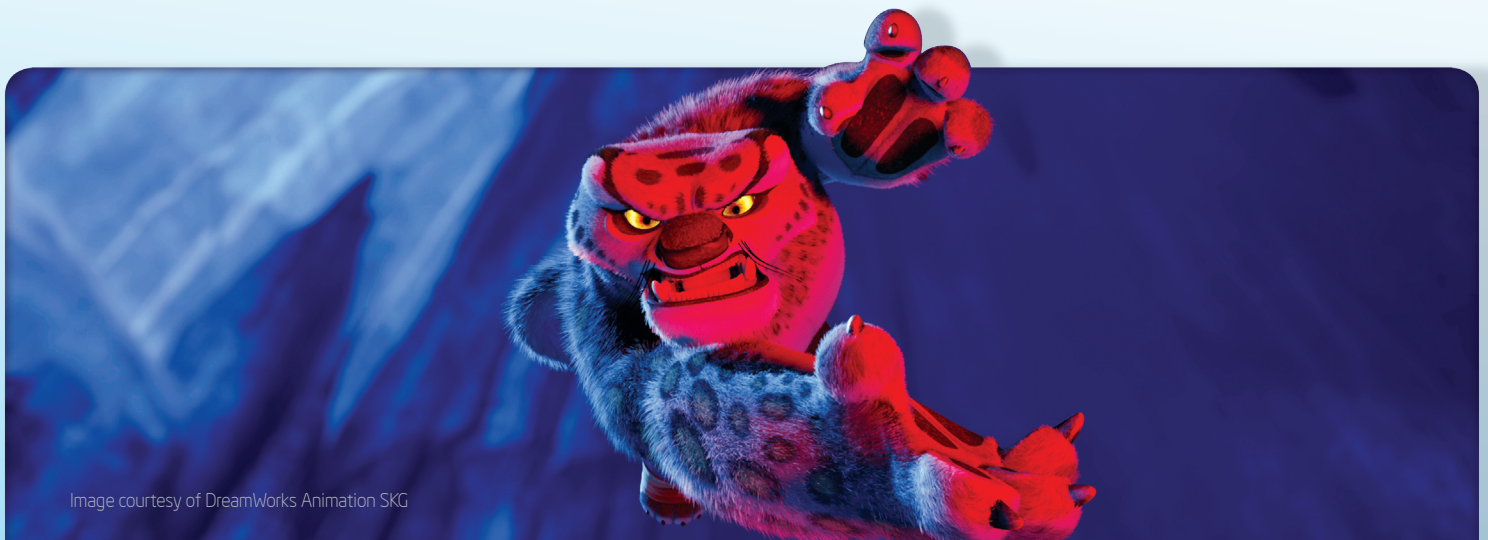
there as the basis of the idea, in Maya the space becomes three-dimensional. We’re suddenly within a spatial world and we can compose spatially. Ultimately, audiences will see this as a spatial composition. It’s no longer going to be seen as a flat 2D composition.”

“If you think of three dials with the lens choice, framing, and stereo depth,” McNally said, “those are the three things we’re trying to achieve a more fluid balance between.”

“Giving our film makers these highly interactive 3D tools is enabling a whole new element to story telling. For DreamWorks Animation, we couldn’t be more excited about the potential for 3D,” said Ed Leonard, CTO, DreamWorks Animation.

Monsters vs. Aliens, scheduled for release by DreamWorks Animation in March 2009, builds on the stereoscopic techniques that have been refined over the past months, including the latest capabilities in Maya 2009 for pre-visualizing and previewing scenes on 3D-capable display systems or projectors during editing.

Maya can also support computer-generated effects that rely on content imported from live image capture.



The Birth of a Movie Image Brand: InTru™ 3D

The March 2009 release of the DreamWorks Animation movie *Monsters vs. Aliens* will signify the commercial launch of a 3D movie image brand: InTru™ 3D. Through acquisitions and the capabilities of the new Intel® many-core visual computing graphics architecture, Intel has created an optimal platform to support DreamWorks Animation's plans for large-scale stereoscopic computer animation projects. In an

interview with

Reuters,

Renee James,
head of
the Intel®
Software
and

Services Group,

commented on the

partnership with DreamWorks, "The two of us will be working together to generate new computer animation from the ground up."

DreamWorks Animation, under the guidance of chief executive Jeffrey Katzenberg, is making a major commitment to 3D, targeting all of their projects starting in 2009 to stereoscopic 3D production, using platforms powered by Intel® architecture components.

"The quality and creativity of where Intel is headed is light years ahead of what we've seen anybody else doing," Katzenberg said.■



Sebastian Sylwan, senior industry manager for film at Autodesk commented, "If you have a live action shot made with stereoscopic cameras, you could track those cameras and apply them inside Maya or inside a compositing package and then composite them together. The next step for us in the pipeline is Toxik, which actually has just been introduced with stereoscopic features. Toxik can read the Maya cameras (that have been tracked or maybe been passed to identify the camera moves) and produce the same camera moves onto the CG element. That element can then be brought into Toxik, with the camera moves, and composited with live action that comes from cameras."

"These systems are designed to be extremely flexible," Sylwan said. "And this is one of the reasons why the partnership with our clients is extremely important: because almost every project has a specific workflow that needs to be followed. So, we need to be not only very aware, but very active in supporting those workflows and making sure that we are an enabler. One of the main capabilities of both Maya and Toxik is to be extremely extensible and extremely flexible—to be very adaptable tools for pipelines. That's why big facilities, our largest clients, such as DreamWorks, have built their pipelines around these tools."

Pre-Visualization Adds Creative Flair to Productions

Under the direction of DreamWorks Animation CEO Jeffrey Katzenberg, every film produced by the studio will be produced in 3D beginning with *Monsters vs. Aliens* in 2009. At this year's SIGGRAPH, DreamWorks Animation proudly

showed off the 3D test sequence of *Kung Fu* as a taste of future of CG film making. The expertise that DreamWorks Animation is acquiring is being reflected in a new pipeline designed to better accommodate stereoscopic workflow and new tools that have been created in collaboration with Autodesk to better explore the creative possibilities of the medium.

Unlike traditional animation, where the workflow follows a very serial process, larger studios are increasing the use of digital design tools to perform pre-visualization of scenes. Pre-visualization allows the luxury of being able to explore the effectiveness of different approaches to a scene and decide what works and what doesn't before going deeper into the animation work. Reporting from SIGGRAPH 2008, Anne Hall notes that DreamWorks Animation formed a Pre-vis Department for the creation of *Kung Fu Panda*.

"The traditional '2D' animation approach of hand off from Story/Storyboard Dept. to Layout Dept. to Animation Dept. is extremely regimented. This was necessary when bringing a scene to life required hundreds of labor-intensive drawings and handmade background paintings, but in a fully 3D feature where the cameras and characters are comparatively easy to move around it seemed unnecessarily limiting," Hall commented. "John [Stevenson, the director of *Kung Fu Panda*] seems to agree in his insistence that the opening fight sequence of *Kung Fu Panda* benefited greatly from their ability use Pre-visualization techniques to choreograph that complex sequence."

¹Source: <http://reports.siggraph.org/s2008/Sessions/kungfupanda.html>

“DreamWorks did a test on *Kung Fu Panda*, a movie that was released only in 2D, to prove the capabilities of stereoscopic film. I think that they successfully debunked many of the myths about stereo production and demonstrated the possibilities of what can be done with stereo.”

Sebastian Sylwan, Senior Industry Manager for Film, Autodesk

“More and more studios,” Hall continued, “seem to be adopting previs into their animation and layout process, changing cameras and angles to work with new ideas directors and animators come up with on the fly. It will be interesting to see how this new process will affect filmmaking in the future. If *Kung Fu Panda* is any indication, it could quickly become part of a new standard in the creation of animated films.”

In stereoscopic works, this type of flexibility extends to determining how effective the stereo effects are, providing cues to the creative director as to camera movements, intraocular distances, and scene composition.

Gauging the Popularity of 3D

Nick Dager, who produces the Digital Cinema Report* (www.digitalcinemareport.com) and keeps a thumb in the wind on new developments, is unwavering in his optimism for this new technology. “I believe stereoscopic 3D is going to transform the entire movie experience from top to bottom,” Dager said, “and, in fact, it will cause a greater change than the introduction of sound. The kinds of movies that are made, how they are made, and the intensity of the movie-going experience are about to get bigger and better than ever.”

“I strongly suspect,” Dager continued, “that once the public at large has a taste of this, people will start demanding more 3D than they already are. The success of the *Beowulf* example wasn’t atypical. So far every digital 3D movie that has come out has done at least a factor of 2.5 times the box office return of the same film in 2D.”

As long as the public continues to demonstrate their interest in 3D movies, voting at the box office through ticket purchases, the studios will continue to improve their storytelling skills in this format. Tools such as Autodesk Maya, with integral application features that make it easier to design, pre-visualize, create, and render 3D, help drive down production costs and enhance the creative edge, giving animators and moviemakers a fresh palette of techniques to hone their craft. As interest in 3D expands into gaming and television, opportunities will likewise blossom for those innovators at the peak of their game. Digital content creators looking for a new medium to reach audiences could discover that 3D is the way to go. ■

FOR MORE INFORMATION

For details about advances in digital cinema, visit the Digital Cinema Report at: www.digitalcinemareport.com.

For more information about Autodesk Maya 2009, visit: www.autodesk.com/maya

For more on the history of Maya and its 10th anniversary celebration, go to: http://area.autodesk.com/maya_anniversary.

For an excellent background on stereoscopy, read the *Autodesk® Stereoscopic Filmmaking Whitepaper: The Business and Technology of Stereoscopic Filmmaking* at: <http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=11906662>.

For lists of 3-D motion picture theaters in different parts of the country, go to: <http://marketsaw.blogspot.com/2007/12/wow-they-are-popping-up-everywhere.html>.

To learn about upcoming animated releases from DreamWorks Animation, go to: www.dreamworksanimation.com.

ABOUT THE AUTHOR: LEE PURCELL

Having survived the frenetic energy of Silicon Valley in its heyday, Lee Purcell now writes on high-tech and alternative energy topics from a rural outpost in the Green Mountain State. Lee blogs on alternative energy topics at lightspeedpub.blogspot.com.

INTEL® CORE™ i7 PROCESSOR TIPS THE PERFORMANCE SCALES

That day in a product's lifecycle when the code name gives way to the actual product name and the formal announcements begin is always a day to celebrate. The Intel engineering team—having applied the finishing touches to the processor design code-named Bloomfield, forged from the 45nm microarchitecture code-named Nehalem—have much cause to revel in their next-generation accomplishment.

Having already acquired a reputation as a high-stepping processing workhorse, Intel® Core™ i7 processor suits applications where large volumes of data, complex algorithms, and real-time requirements converge. The processor design, featuring four cores, excels at such demanding tasks as massively multiplayer online games, real-time medical diagnostics, scientific research, extreme gaming, digital content creation, and similar high-end, data-crunching operations.

Clocking in at the top of the performance benchmark spectrum, the Intel Core i7 introduces intelligent processing features to elevate multi-tasking to new levels.

Intel® Turbo Boost Technology saves energy by dropping inactive cores to zero consumption and responding to workload demands in turbo mode by adding additional performance bins. Intel® Hyper-Threading technology supports up to eight simultaneous threads, ideal for distributing AI, physics, and rendering for ultra-realistic gaming. An integrated memory controller boosts memory bandwidth performance, and the 8 MB shared Intel® Smart Cache dynamically allocates resources to match the demands of individual cores for fast, efficient data manipulation.

Working closely with key players in the ecosystem, Intel has helped over a hundred independent software vendors optimize applications for the multi-threading capabilities of the Intel Core i7 processor. The stage is set for a scorching performance. ■

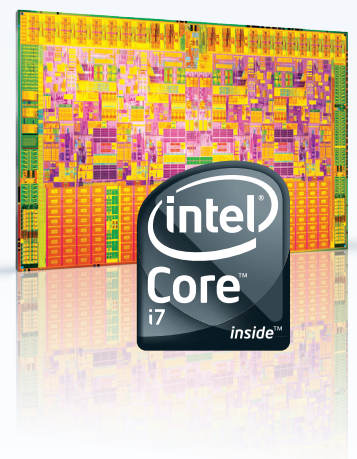
Animators and Animation Fans to Create the First Community- Driven Short Film on the Facebook* Platform

Artists around the world are invited to animate the shots of a 5-minute, CGI-animated short film titled Live Music, which is produced and directed by Yair Landau, former president of Sony Pictures Digital. The collaboration, through a unique application built on the Facebook platform, will run through January 30, 2008. Animators, regardless of experience, may begin work immediately.

The tools and 3D models that animators will need to collaborate on this project including Autodesk Maya 3D Animation* software are provided, and can be accessed through the Mass Animation page on Facebook.

"This project is about the magic that can happen when thousands of artistic people all over the world put powerful computing tools to use in the spirit of collaboration," said Michael Hoefflinger, general manager of Intel's Partner Marketing Group.

Visit www.facebook.com/massanimation to start collaborating today. ■



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