

# Trick *and* Treat: Behind the Scenes of the New *Nightmare Before Christmas* and the 3D Movie Revolution

How George Lucas' special effects house and new digital projection technology are manipulating images so fast your brain can't tell the difference and how Hollywood can.



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**After reconstructing every character and set in *Nightmare* to create a rotated picture for the second eye, a team of computer graphics engineers split each frame into layers that pop out to the audience at different depths. (Video still courtesy of Disney Enterprises, Inc.)**

**PopularMechanics.com, Oct. 31, 2006** -- When Disney executives first approached Colum Slevin about revamping its stop-motion animated classic *The Nightmare Before Christmas* into three dimensions, there was more head-scratching going on at George Lucas' Industrial Light and Magic offices than by Chewbacca with a hide full of fleas. Could Slevin and his team really engineer a computer-graphics miracle to recreate all of Tim Burton's beloved puppets for high-quality (and high-grossing) 3D, or would this just be a gimmicky feature like the 20 minutes of *Superman Returns* in IMAX? Thirteen years after the original, with no quick-fix digital version to work from and the necessary polarized projection technology just beginning to roll out, was it really worth it?

"It seemed prohibitive, and that in and of itself seemed appealing," says *Star Wars* vet Slevin, ILM's executive in charge of production and a *Nightmare 3D* executive producer. "We don't like to be told what we can and cannot do."

What the ILM impresarios did was digitally transform Jack Skellington's Halloweentown into perhaps Hollywood's finest technical accomplishment of the year, completing the first-ever conversion of an entire celluloid film into 3D at a breaking point for the now burgeoning format of red-and-green glasses lore. Take that, Superman.

The fundamental trick of 3D film is to convince the brain into having depth perception by sending discreet images to each eye. While the left eye can enjoy a cleaned-up version of the original movie, the painstaking challenge of 3D conversion lies in reconstructing each frame for the right eye--essentially making a second version of the movie that appears rotated two or three inches to the right to make up for the interocular distance and create a combined, or "stereo," point of view.

That was easy enough for Slevin and his computer-graphics designers when they developed Disney's 2005 *Chicken Little* in both 2D and 3D with only computer-animated graphics. But for *The Nightmare Before Christmas*, with its 770 shots of meticulously constructed stop-motion puppets, they had to create computer-generated proxies of every character and see digital effects tricks it had discovered in the *Star Wars* re-release days, was able to project the digitized original version directly onto these new CG "mannequins," then swing the digital camera over a few inches for the right eye's brand-new perspective.

From there, the ILM team cut each frame into wedding-cake layers, which would pop out to the audience at different depths and speeds based on their "stereo" script for the film. "It was basically sort of a flow chart for the points where things became more intense and more relaxed,"

Slevin says. "It's a little bit of the same field of knowledge as creating a movie."

The result was a seamless layover of computer animation on top of stop-motion artistry--even the notoriously picky Burton says "the movie has kept its original purity, and the 3D actually adds much more to it." But that was only the right eye's worth, leaving the task of presenting an optical illusion that has eluded Hollywood for more than 50 years up to the increasingly advanced field of digital projection technology.

***To project pumpkin king Jack Skellington in 3-D without giving audience members the nausea of 1950's-era experiments with the format, a digital projector alternates at high speed between images intended for each eye. (Disney Enterprises, Inc.)***

Disney sent a hard-drive with the 3D remastering to Real D, a young company whose optical and digital-signal-processing advancements simultaneously feed images for each eye into one high-end DLP projector. With the left-eye, right-eye images alternating at high-speed, polarized light beams the light waves carrying each different-angled picture into only the eye that's meant to see it.

If an audience member closed his right eye, he'd see a movie that came out in 1993. But open it, and the polarized, Ray-Ban-esque glasses for *Nightmare 3D* split the back-and-forth frames moving so fast his brain can't tell the difference.

"Hollywood has failed again and again in separating the right and the left eye," says Josh Greer, co-founder and CEO of Real D, which also supports 3D projection for the U.S. military, NASA and the automotive and aviation industries. "There was the problem of 'ghosting,' which is light leakage--meaning that when you're looking at the left eye, some of the right eye image leaks through and creates nausea. Now Real D is trying to look at the fundamental idea of 3D systems and perfect it."

Disney helped the cause by partnering with Real D in the installation of more 3D digital projectors for the release of *Chicken Little*, and top theater chains outfitted themselves with the technology for this year's *Monster House*. While Real D chairman Michael Lewis projects the company will have 500 screens equipped worldwide by the March release of Disney's *Meet the Robinsons*, digital projection remains in its infancy, with even the most enthusiastic proponents among filmmakers taking a wait-and-see approach.

"It's going to take a while," Lucas told Popular Mechanics [in an interview last year](#). "Eventually, most films will be shown digitally, and a few will be shown on film." He still hopes to re-release all six episodes of his *Star Wars* series in 3D, but only once theater technology is ready.

*Titanic* director James Cameron has gone one step further, insisting that he will film solely in the format from now on with his own 3D rig, beginning with 2008's *Avatar* and *Battle Angel* the following year. "Digital 3D is a revolutionary form of showmanship that is within our grasp," he proclaimed at the National Association of Broadcasters' Digital Cinema Summit in April. "It can get people off their butts and away from their portable devices and get people back in theaters."

Robert Zemeckis' 2004 *Polar Express*, for example, proved a huge success--and motivation for holiday 3D movies like *Nightmare*--when it took in \$45 million for its co-release in IMAX 3D, the format leader with about double as many screens as Real D. Combine that with the IMAX records for the select scenes of *Superman Returns* in 3D, last year's box-office slump and poll numbers showing Americans would return to theaters with more full-length features in 3D, and Hollywood is ready to jump beyond the silver screen.

Before the end of the year, IMAX will show the computer-animated *Open Season* in 3D, with Zemeckis' *Beowulf* following in performance-capture animation for 2007. If that weren't enough to give Jack Skellington a run for his holidays, he better watch out: Harry Potter might be coming to