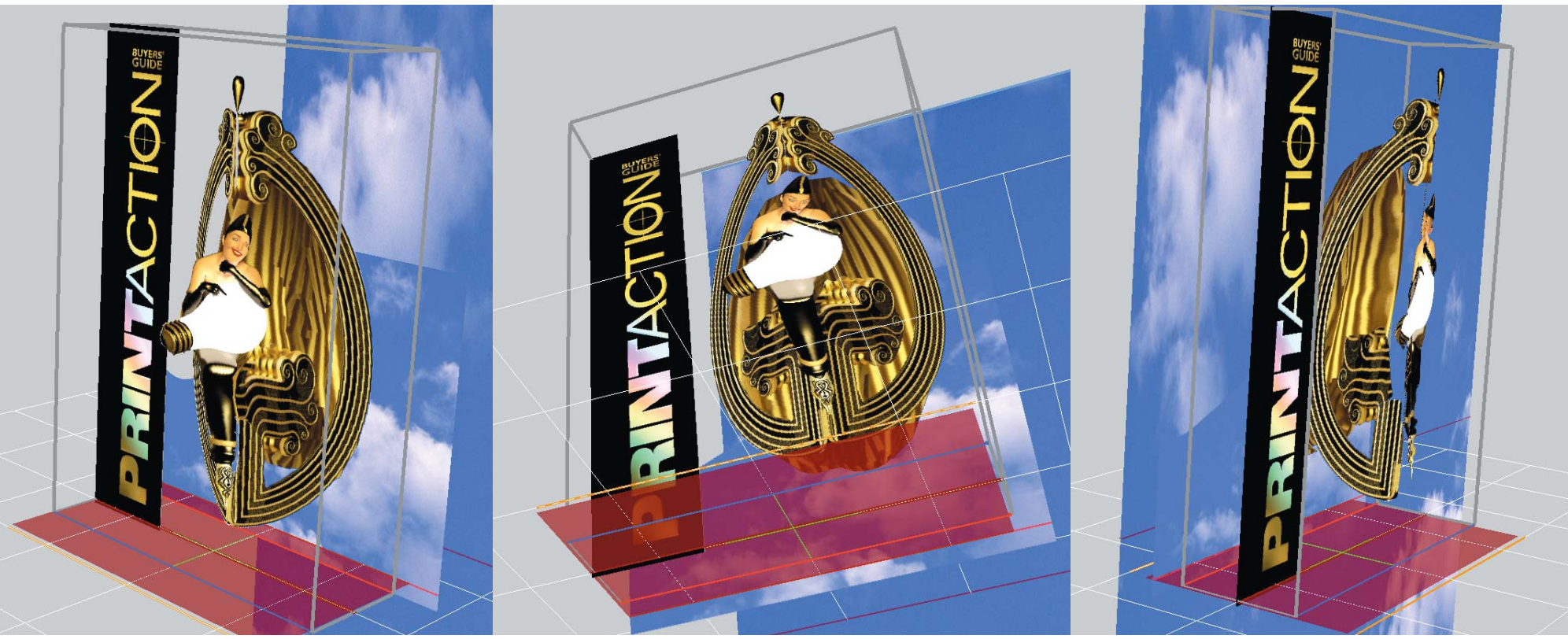
Seeing 3D in 2010



The three dimensional view of the PrintAction Buyers' Guide cover within HumanEyes Creative3D.

3D it seems, is once again in vogue. With the box office success of movies such as *Avatar* and the incoming deluge of 3D television sets, the entertainment sector is once again setting its eyes on features in the third dimension. With that comes an inevitable need to market those products, be it a Blu-ray case on the shelf or backlit posters in theatres. Lenticular printing is posed to make a jump in the near future as it simply is the most effective way to convey 3D in marketing.

Lenticular, of course, isn't new: novelty lenticular prints span back over 60 years. While high definition (10,000 dpi) CTP and plates have been on the market for years and were predominantly used by security printers, typical CTPs have also made huge strides in resolution. The new generation of lenticular is now within the reach for more printers, moving from what was once a black art to a discipline many high-resolution (400 lpi or higher) commercial printer can adopt.

Central to this shift is in the development of software, which aids in commoditizing previously highly proprietary lenticular R&D. Lenticular consultants such as AGOG House of Lenticular and artClone3D (both associated with the *PrintAction Buyers' Guide* cover, see sidebar right), have experienced the shift. ArtClone3D's Ernesto Clark decided to go into the business of guiding others into the world of lenticular. One of these moves included a partnership with lenticular software provider HumanEyes.

"HumanEyes killed a lot of these lenticular gurus, whether in-house or consultants, who would not share any information, even with their co-workers," says Clark. "Now with HumanEyes, the information is for sale. Printers no longer have to feel like they have to do the extensive R&D themselves."

In addition to software technology, consultants like artClone3D or AGOG are playing a large role in bringing experienced players to the table, based on a printer's needs. They connect the printer with a substrate partner, software and other expertise, or sometimes just to see if lenticular is a right fit for the printer.

Clark is quick to admit that the learning curve for lenticular is still steep, despite the advances in software, which only figures in half of the equation. The other half involves developing a workflow which includes much more communication than most printers are used to, working backwards with all parties including the lens vendor, who can provide much input on achieving certain effects. The designer, critically, also needs to be well informed to ensure they are designing to achieve maximum results with a given lens.

Of course, lenticular printing is not limited to the offset litho world. Flexographic lenticular printing is starting to make its mark with the development of high-resolution digital plates, such as the Kodak Flexcel NX. The latest generations of high-resolution wide-format machines are also churning out poster-sized lenticular prints for movie theatres. Even toner-based devices are entering the lenticular world and are well-suited to short-run applications.

Looking through HumanEyes

HumanEyes is one of several software vendors aimed at easing the development of lenticular design and prepress. There are three components to HumanEyes software: Producer3D, Capture3D and Creative3D. Each of these pieces are aimed at defusing some of the more arcane knowledge previously associated with lenticular. Creative3D allows designers to take a flat image, mask out certain areas and protrude them into three dimensions. Previously, this would have been accomplished by depth masks, where light areas appear closer and dark areas look further away. Instead of relying on the artist to imagine his or her work in the third dimension, HumanEyes creates a credible on-screen model. A tool called the depth brush lets the user push or pull elements on the image in real time.

The Creative3D software also includes presets for lenticular lens settings, which predefines the amount of depth in a 3D lenticular image or the number of frames for a video piece. This brings the designer closer into the workflow process, which lessens the chance of creating art which is unsuitable for the lens used. The tool, in addition to creating 3D effects, can also create simulated video (up to 30 frames) or more traditional morph and flip effects.

Capture3D is a tool which aids photographers in capturing lenticular-ready photos. Photographers follow a series of instructions regarding which camera angles are required in the sequence. The software then processes the pictures, readying them for output.Producer3D, which also includes Creative3D and Capture3D, is the prepress tool for printers. Files, either generated from Creative 3D, Capture 3D or even third-party 3D software, are input into Producer3D. Producer3D then generates a proof using inkjet. When placed under the appropriate lens, the inkjet proof will be a close approximation of the final product. The proof and the final product varies slightly as looking through a lens at a proof print conveys less depth than printing directly on the lens itself via offset.

Producer3D software also helps in the vital step of conducting a pitch test. A plate is imaged with very fine lines and loaded onto the final printing unit of the press to be used for the job. The purpose of the test is to calibrate the press material and how one affects the other in printing process. The test should also be run on each new batch of lenticular material as a precaution against any potential variance. Once the pitch is measured off of the test lenses, the resultant data is plugged back into Producer3D and the software will take the pitch variance into account when interlacing the art for plating. Interlacing takes the separate frames of the art and reorganizes them to fit precisely into the lenticules, or separate lenses, which make up the lens array. In the past, an intricate manual calculation would have been required.

More lenticular sheets

In the early 1990s when modern lenticular manufacturing technique was created, lenses mainly came from two companies based in close proximity to each other in Wisconsin, partially because they were among the first with the technology, but also because there was relatively little demand. Within the last five years however, high-tech extrusion plants in China, in partnership with sub-manufacturers such as LPC World (which supplied lenses for the *PrintAction Buyers' Guide* cover), have released

new lenses onto the market, with significant savings over the American lenses. Even today, there are only a handful of extrusion companies around the world producing lenticular sheets. With the cost of a single lenticular sheet being much more than paper, any improvements in price or additional material waste has a huge impact to a project's profitability.

The development of lenticular sheet technology is heavily reliant on printing technologies. Although sheets of 200 lpi lenses are now available, they are difficult to print on due to its dimensional instability in heat. Higher lpi lenses have lessened depth but importantly adds the most flexibility, and actually costs less due to the smaller amount of raw materials used. Magazine covers are printed on thinner 100 lpi lenticular sheets, for example, where as the most common offset litho gauge is 75 lpi, which accounts for approximately two-thirds of the purchases. In time, less temperamental lenses, combined with improvements in offset litho printing will simultaneously drive up the quality of lenticular and drive down material costs. Falling costs would also open up new markets where it is currently unfeasible to do lenticular, such as for magazines, in which only a handful have been attempted and only for special occasions (such as *Rolling Stone*'s 1,000th issue cover in 2006.)

Viewing angles of the lenticular sheets are important to the type of lenticular being printed. 3D lenticular images benefit from narrow viewing angles while morph, animation and flip art are best paired with a wide lenticular sheet with wide viewing angles (greater than 40 degree). The orientation of the lens also dictates which effects may be used: a lens running vertically is for 3D effects whereas a horizontal lens cannot be used to show 3D due to how our eyes are arrayed. Of course, if one is printing a poster or packaging, a vertical lens should also be used as it best shows movement as a viewer walks by.

Printing lenticular

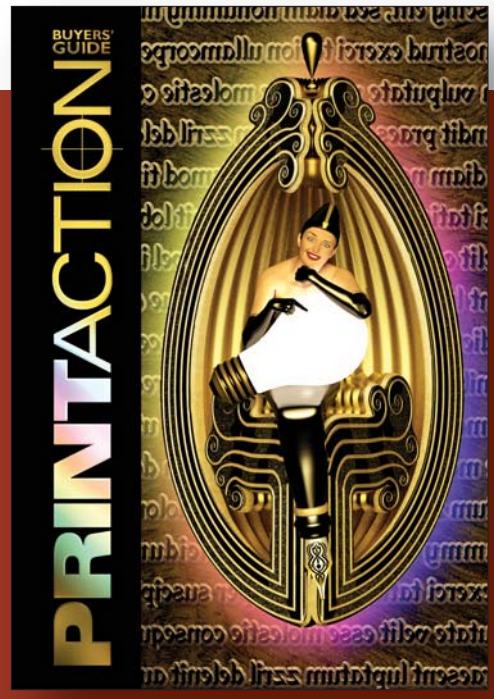
The RIP and CTP play a large role in the quality of a lenticular print. While average machines can produce an acceptable result, when the work is compared to another created using a higher resolution RIP and CTP, the difference between 2,400 dpi and 4,800 dpi image is exponential in the final product. When it comes to video lenticular, a higher resolution image allows for more video frames.

"The majority of commercial printers already have the minimum spec for commercial work. Very few own or upgrade for the high resolution because they've never had to," says Clark. "I usually show printers both resolutions, apples to apples, and when they see the results, they make the upgrade to the higher resolution. The look is day and night, hands down, it's not even close."

From plating, traditional printing craft takes over. The quality and consistency of a printer are crucial variables in lenticular printing. Well-maintained presses, the newer the better, make or break the job. One reason lenticular printing has generally been in the hands of a few is that the best way of applying ink to lenticular is through a UV process due to instant curing. With non-UV applications, temperature control of the IR lamps is important to lessen flaring, which adds to waste. Even then, completed lenticular sheets need to be stacked on short lifts to allow for even more drying once off press. Just coming into production are non-UV inks that adhere faster to lenticular sheets, which will allow printers who do not have a UV-dedicated press to try their hand at lenticular without elaborate drying setups. Static is another factor which also contribute to the complexity in running a lenticular job.

"Overall, it's just more meticulous," says Clark in describing the difference between imaging on plastic over paper. "Once a pressman has experience running it, they'll know how to make it go faster." The experience for a new lenticular printer can be long, labourous and – without a commitment to knowing the market, upgrading equipment and developing sales – unprofitable. Nevertheless, printers who choose to develop lenticular into a specialty will create a niche that competitors would find difficult to encroach. ⊕

– Clive Chan



The lenticular cover for this year's Buyers' Guide is a demonstration of the latest lenticular techniques.

PrintAction Buyers' Guide Cover

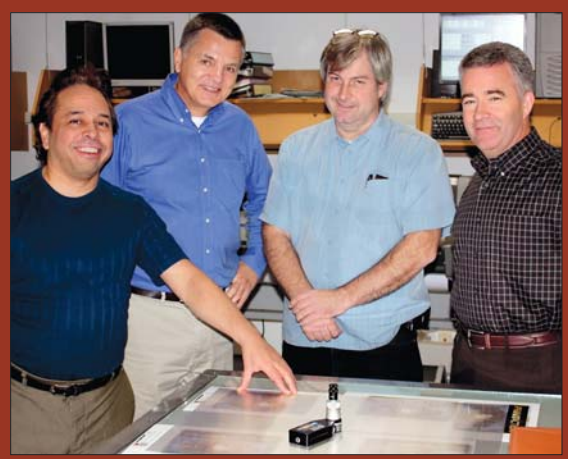
THE PRODUCTION OF THIS YEAR'S BUYERS' GUIDE COVER was a collaboration between seven parties. Greg Maloney of AGOG House of Lenticular oversaw the project's progression and co-ordination.

Artist Seth Rowanwood from InkLight created the design using a 3D software package known as Modo. It is a lighthearted 3D image which pays homage to the graphic designer's creation of an idea. From there, the artwork was fed into HumanEye software by Ernesto Clark. Clark was on-hand to provide support for all parties, but specifically to consult with Toronto-based C.J. Graphics on the printing process.

The file was proofed and adjusted on site by *PrintAction* staff, Clark and the staff at C.J. Graphics to maximize the lenticular effect, using HumanEyes Creative3D software in the process.

Lenticular sheets were supplied by John Van Leeuwen at Quebec-based LPC World, who was also on hand to provide feedback and advice during the proofing process. The cover was printed on 20 x 28 sheets of 17.7 point, 75 lpi lenses with a 49 degree viewing angle. A total of 12,000 were produced.

After the lenticular element was printed at C.J. Graphics, the pieces were sent down the street to Laminating Choice, where a printable polypropylene, provided by Transilwrap of Canada, was applied to the back. Care was employed to minimize the impact of heat and pressure during this step to prevent distortion on the lenticular side. From there, the covers were sent back to C.J. Graphics where the back of the cover was printed. Finally, the covers were sent to York Bindery where they were united with the rest of the guide and coil bound.



L to R: Ernesto Clark of artClone3D, John Van Leeuwen of LPC World, David Adams, General Manager of Colour Technologies (a C.J. Graphics Company) and Greg Maloney of AGOG House of Lenticular.

The pitch test requires a careful look at the test sheet to calculate the proper interlace of the final product.

Dave Monette, C.J. Graphic's VP of Manufacturing looks at the motion on the print.

Prepress Manager Pablo Verdugo (foreground) and Lead Press Operator Mic Tomkins inspect the registration on the pieces during its run.

The covers had to be stacked on short lifts to ensure proper drying without distortion.