

Free DVD
inside

Real Colors • Smoke and Fog Effects • Precision Selections • Lightroom 4

ct Digital Photography

The in-depth quarterly for the photo enthusiast

Free DVD

Test Images
Photoshop Tutorials
Full Version Software

Creative Corner

Time-lapse Photography

Techniques, Clips on DVD

Smoke and Fog Effects

Hands-on tricks of the trade

Software

HD Slideshow Tools What's new in Lightroom 4

Workshops

Precision Selections

The ultimate image editing challenge

Interior Photos

How to shoot indoor architecture

Real Color

Perfect Color Management from Exposure to Print

8 (2012) • \$14.99
Summer Issue



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Conference and Workshops



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Photographers!

We are proud to announce a premium two-day event aimed at presenting a balanced view of the wide world of contemporary photography. Some of the world's leading photographers and educators will come together to present and discuss the art, craft, and technology of their trade.

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Visit www.rockynook.com/photoact2012
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August 24–25, 2012  Santa Barbara, CA



Let's assume our article on interior photography on page 100 has got you all fired up and you've taken a series of finely composed images, but the colors on the monitor don't look like the ones you saw in the viewfinder while you were shooting. Help is at hand! Our workshop on page 18 gives you all the inside knowledge and expert tips you need to produce authentic colors from exposure to print, so when you're out and about searching for exciting subjects you can be sure that your next multimedia slideshow will look fantastic. And to guarantee you know which tools deliver the best results, we have also tested all the latest slideshow software for you (page 130).

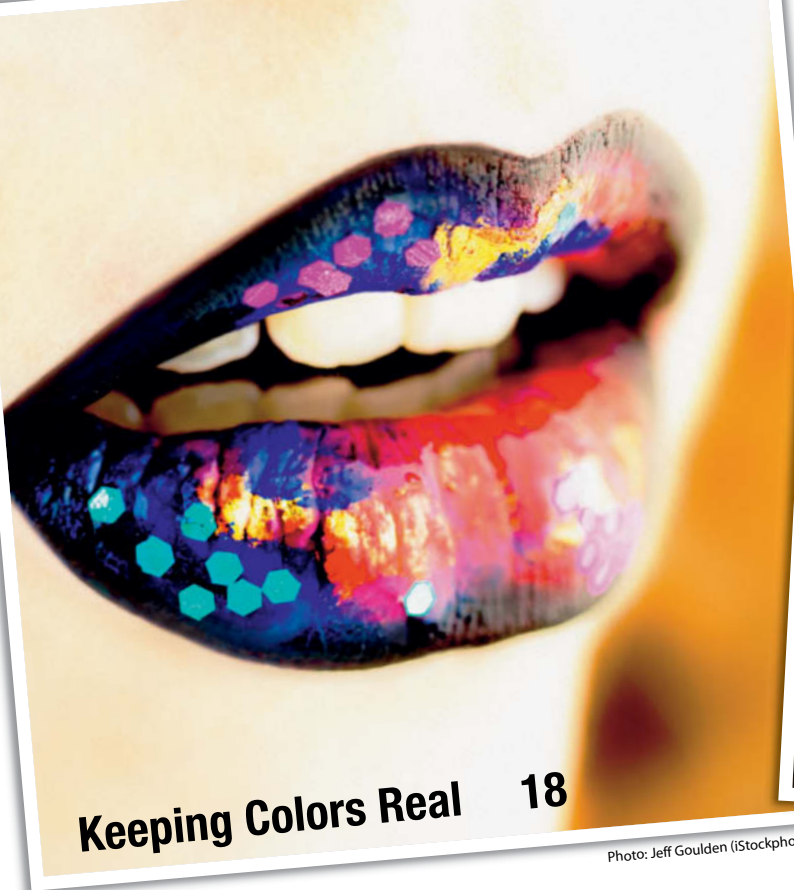
There are hundreds of articles and dozens of books out there on the subject of making selections using Photoshop, but we are convinced that this issue's bumper article by our resident Adobe expert Maïke Jarsetz will leave none of your questions unanswered, from straight edge selections to isolating the finest fur (page 44).

Have two years passed already? When *c't Digital Photography* started way back in 2010, we had no idea where our journey would lead, although we have always believed that there is a market for our high-quality approach – and the many enthusiastic comments and letters we receive continue to prove us right.

The *c't Digital Photography* team would like to say a big 'Thank You' to all of our long-time fans and all the new readers who are helping to make us bigger and better with every issue.

Have fun with number 8!

Juergen Rink
Editor



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Photo: Jeff Goulden (iStockphoto.com)



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Portfolio

Thomas Wrede's model worlds tread the fine line between real and surreal.

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If you want the deep green of a meadow to look just as luscious in print or on a monitor as it did through the viewfinder, color management is what you need. This article explains how to set up your workflow to give you perfect colors all the way down the line.

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What's New in Lightroom 4

Adobe's latest Lightroom offering introduces map and book creation modules, as well as many improvements to the workflow. We fill you in on the details and explain some of the new version's highlights.

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Free, Self-hosted Web Galleries

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- 122 Open Source Gallery

HD Slideshow Software

The HD television in your living room is the perfect tool for viewing high-resolution slideshows. We take a look at the available software and check out its suitability for creating HD photo shows with audio and video special effects.

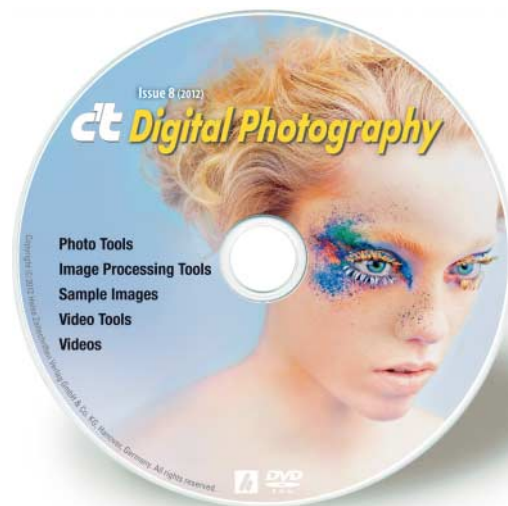
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DVD Download

An image of the free DVD provided with the magazine is available for download at www.ct-digiphoto.com/dvd082012.

Readers' Letters

Reviews How They Should Be

Just wanted to say that I love your magazine and think the way you approach the camera reviews is the way it should be done. Technical, with no bias for one brand or another. Well done indeed. That being said, I was wondering if you are planning a review of the Sigma SD1. I am currently a Sigma shooter and an avid member of the Sigma forum on DPreview.com (toasterflyer). Since this camera was announced it has stirred up a lot of anticipation in the forum and among regular Sigma shooters.

But now that the camera has been released at an unexpectedly high price we are all wondering why the high price and whether this camera is worth that much money in view of the current competition. I believe the way you do your camera reviews will really shed some light on this. For a camera that offers so much IQ yet not much in the way of modern features or components, I would really like to know what your reviewers think of this overpriced beast of a camera.

Richard Haas

PDF Versions of Earlier Issues

c't Digital Photography is the best photography magazine I know and I find it very informative. Is it possible to get PDF (or PostScript) versions of old issues? Perhaps also including the previous version on each issue's DVD? I like using a local search tool to find information. Thanks for the great magazine.

Richard



Tell us what you think:

We are always happy to receive your comments and suggestions in a letter, an e-mail to editor@ct-digiphoto.com or at www.facebook.com/ct-digiphoto. We reserve the right to abbreviate your input for publication. Our comments are printed in italics.

All previous and current issues are available via our free iPad app (itunes.apple.com/app/ct-digital-photography/id439662182?mt=8), which includes search functionality. You can read the iPad version of the magazine either by purchasing individual copies or by purchasing a subscription to the print version, which includes free iPad access to all available digital issues.

c't Digital Photography is also available at zinio for single issue or subscription purchase, but please note that our DVD content is not currently available with the zinio edition of the magazine.

GigaPan Stitch Suddenly More Expensive?

How to Shoot Gigapixel Images, *c't Digital Photography* 7 (2012)

I was blown away by the article on doing Gigapixel photos. So much so that I am going to dive into making some and see if I have the skills to make some nice ones.

I am also writing because in the article you said that the GigaPan Stitch software costs US\$9.99 and I was thrilled to find out that the software for making large panos was so inexpensive. However, when I went to <http://gigapan.com/cms/shop/software> to purchase it, the prices were US\$149 and US\$79.

Was the article price a misprint or am I looking at the wrong site for the download and purchase?

I really am enjoying your magazine and have gotten several great ideas for improving my own photography skills.

Andy Killgore

We took a closer look at GigaPan and discovered that the company changed its pricing and software options in March of this year. The stitching software now appears to be available either bundled with hardware or as a standalone for US\$79. The new Efx version costs US\$149. Due to the price change, our author no longer recommends buying the program, and there is better software available for the money – for example, PTGui Pro (www.ptgui.com/order.html).

... and what people are saying about us on the Web:

Emphasis on the Photographer, the Process and the Workflow.

Within the covers of *c't Digital Photography* lies an intelligent, well thought out magazine that treats the reader with respect and not just as fodder for the industry advertisers. If you think about your own photography in a more sophisticated way than simply as a race to afford the latest and most expensive equipment then this magazine is probably for you. The articles are in-depth and original and the magazine is not equipment-centric. The emphasis is very much on the photographer, the process and the workflow.

<http://minimalistphotography101.com/ct-digital-photography-a-genuinely-useful-photography-magazine/>

Minimalist Photography 101

Off the Beaten Path

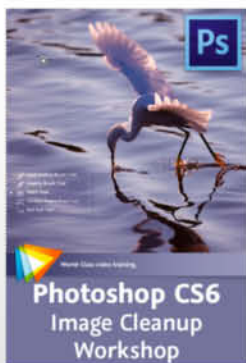
Like its German-language sister magazine *c't*, which I've been reading for quite a number of years now, *c't Digital Photography* is really excellent and I can only compliment the publishing team for a job well done.

c't goes off the beaten path to deal with lots of OS X and Linux info in an in-depth way. Happy to see that *c't Digital Photography* deals likewise with focus stacking, HDR, noise reduction etc., and manages to get away from a Photoshop-only approach to include open source options as well as commercial offerings from around the globe. I truly appreciated the article on Luminance HDR in issue 7, it was brilliant.

www.facebook.com/profile.php?id=100001542586539

Mike Bing

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Tim Grey
2 hrs 10 min, \$34.99



Tim Grey
2 hrs, \$34.99



Tim Grey
2 hrs 20 min, \$34.99



Steve Caplin
1 hr 45 min, \$29.99



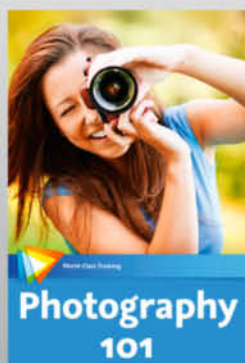
Uli Staiger
55 min, \$16.99



Tim Grey
2 hrs 19 min, \$34.99



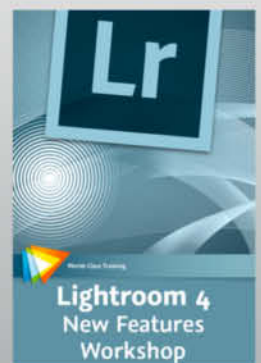
Richard West
4 hrs 50 min, \$54.99



Joseph Linaschke
2 hrs 10 min, \$34.99



Tim Grey
3 hrs 21 min, \$34.99



Mikkel Aaland
2 hrs 10 min, \$29.99

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DVD Highlights

Highlights of this issue's free DVD include an exclusive set of *Photoshop* video tutorials, sample images and video clips from the articles and tests in the magazine and a free full version of the *Smart Shooter* camera remote control software. Our free software selection also includes *ShiftN*, which is designed to help you combat converging verticals, as explained in our article on interior photography.



Smart Shooter

Full Version Software: This exclusive c't full version software enables you to completely control your Nikon or Canon DSLR remotely using your computer. The application is script-compatible, and allows you to program complex shooting sequences and view the results in seconds on your computer's monitor.

This is a full-featured DSLR remote control program designed to work with a wide range of Canon and Nikon cameras. The only current limitation is that Nikon users cannot use the Bulb (B) shutter setting, while Canon users have access to all the program's features and functions. Smart Shooter offers a complete range of tethered shooting and remote capture features, including live view monitor output (with individual frame capture), automatic image download and display, autofocus support, and scripted shooting functionality with individual exposure and focus settings – perfect for shooting macro focus stacking sequences. You can view, pan and zoom JPEG and RAW results in real time at 1:1 on your computer's monitor.

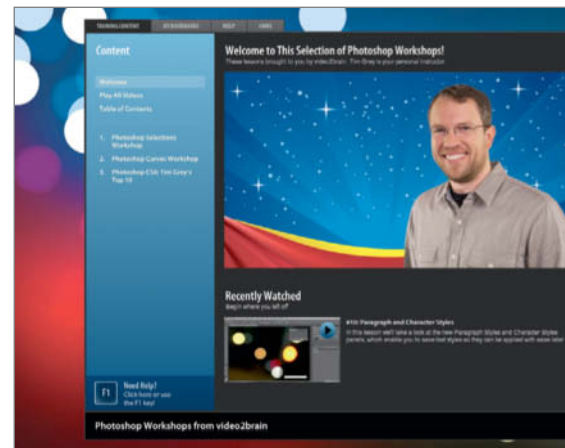
To simplify working with scripts and to enable you to unleash the full potential of this powerful tool, the program's author, Francis Hart, offers script API documentation and sample scripts at www.hartcw.com. The website also includes a detailed overview of

all supported cameras and lists any limitations that apply to specific models.

There is no limit to the number of cameras the software can control. This means you can, for example, capture a 360-degree panorama using multiple cameras and a single mouse click. Combining exposure and focus bracketing sequences enables you to shoot 360-degree HDR Macro scenes with enhanced depth of field.

The current 1.0 version of the software is included on this issue's DVD and is fully functional once you have registered it for free at <http://hartcw.com/promo/ct-digiphoto>. The developer is currently working on a successor version that should be available in the next quarter. c't *Digital Photography* readers who purchase the new version before October 31st 2012 using the voucher code **SS2CTDP** will receive a 30% discount.

The software included on this issue's free DVD is equivalent to the full version available at www.hartcw.com for US\$50 (GB£32) and works on Windows PCs and Intel Macs. (tho)



video2brain Tutorials

Photoshop Workshops: Tim Grey discusses selection tools and techniques, and explains how to use curves to optimize your images. The videos also include Tim's personal top ten new features in *Photoshop CS6*.

Extracting successful selections is a serious challenge for many photographers. In this workshop, Tim Grey introduces the various selection tools and explains how to use them effectively. Amongst other things, he tells us when the Lasso tool is preferable to the Magic Wand and how efficient the Quick Selection tool really is when separating a subject from its background. The second part of the workshop is dedicated to selecting complex objects that test the limits of the program's simpler tools, and shows you how to use masks and channels to make and save selections. Tim also demonstrates how to use the Pen tool to make precise selections in objects with complex shapes.

The other main theme of this set of workshops is the use of curves. The Photoshop Curves tool can be used to make targeted adjustments, select a white point and to adapt contrast within an image. This 40-minute video details how to use the tool efficiently and effectively, explaining the use of anchor points and freehand brushes as well as how to save



your settings as a preset for future use. The workshop also explains how to use masks to limit effects and apply them selectively.

Photoshop CS6 introduces a range of new and optimized tools and functions. In our final video, Tim Grey tells us about his personal top ten new features and gives us an overview of the new version's capabilities. With its darker user interface and menus, CS6 looks a lot more like its RAW converter cousin *Lightroom* than its predecessors, and the new features are definitely oriented toward photographers. The revised Crop tool now includes automatic perspective correction functionality, and there are a number of new Content Aware tools that help you to invisibly correct a wide range of image errors and enable you to move objects within an image without leaving any gaps in the background.

These videos, with a total running time of more than two and a half hours, are part of the Photoshop Selections Workshop and Photoshop Curves Workshop videos available at www.video2brain.com for US\$29.99 each. (tho)



Image Processing Tools

GIMP
 GIMP Portable 2.6.12
 GraphicConverter 7.6.2
 GREYC's Magic Image Converter (G'MIC)
 Image Analyzer 1.34
 ImageJ 1.45
 Inkscape
 Inkscape Portable 0.48.2
 JDraw 1.1.5
 Mosaizer Pro 9.2.140
 Paint.NET 3.5.10
 Picasa 3.9.0
 PSPi
 ShiftN 3.6
 StylePix 1.9.2
 StylePix Portable 1.9.2

Photo Tools

AmoK Exif Sorter 2.5.6
 EXIFeditor 2.2.2994.38866
 Exifer 2.1.5
 ExifTool 8.89
 Gallery 3.0.3
 GeoSetter 3.4.16
 GeoSetter Portable 3.4.16

IrfanView 4.33
 IrfanView PlugIns 4.33
 IrfanView Portable 4.33
 jAlbum 10.6
 MacPorts 2.0.4
 Rawker 2.3.4
 Smart Shooter 1.1.14
 ThumbsUp 4.5
 XAMPP
 Xee 2.2

Sample Images

Color Management Test Images
 Precision Selection Sample Images

Videos

Time-lapse Photography Sample Clips
 Photoshop Workshop

Video Tools

Deshaker 3.0
 PhotoLapse 3.0
 VirtualDub 1.9.11
 VirtualDub Portable 1.9.11



Photo: Antonia Eggeling

Portfolio

Thomas Wrede

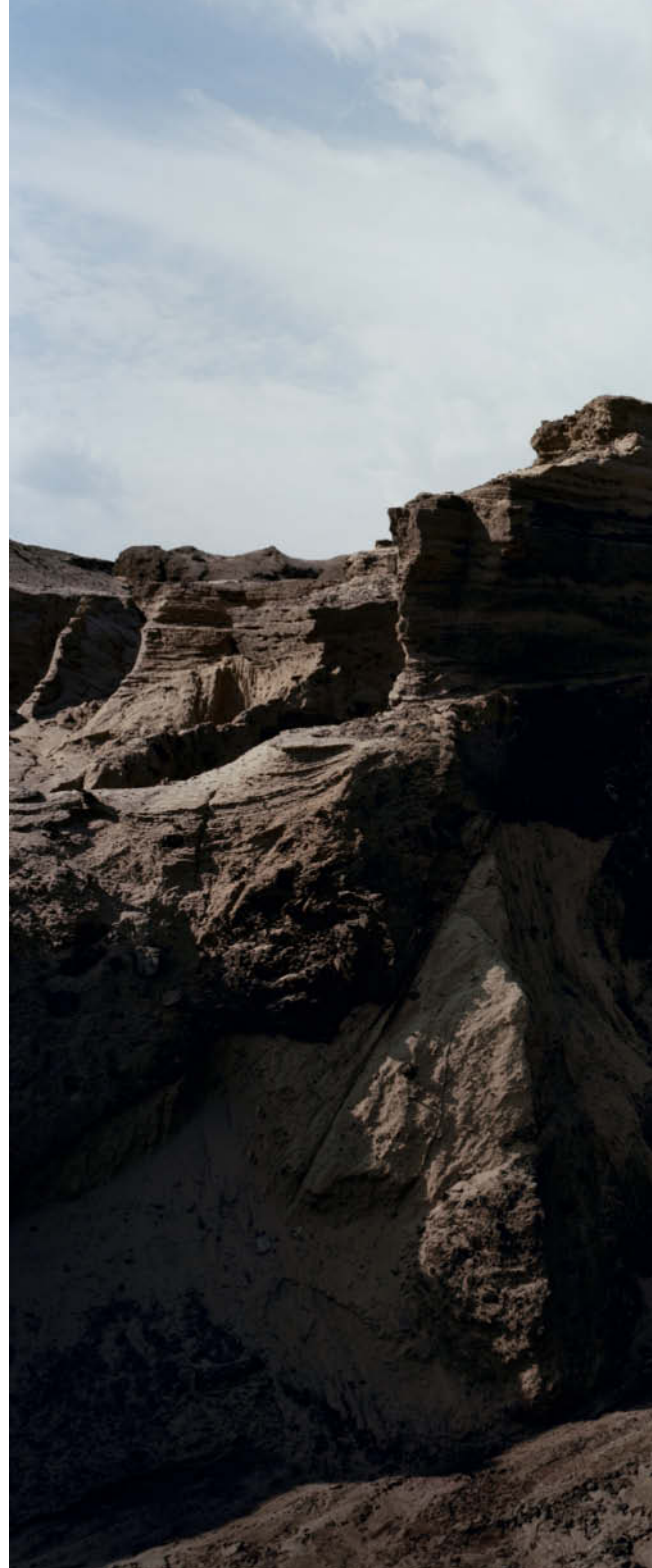
For his 'Real Landscapes' series, Thomas Wrede places small models in a natural setting and photographs them as if they were real. Viewers can either simply appreciate the aesthetics of the images or try to put their finger on what it is that doesn't look quite right. Wrede's works are exhibited in galleries and museums all over the world.

Such an idyllic summer scene (page 12) – beautiful blue sky, summery clouds reflected in the water between the sandbanks, a house on stilts at the water's edge and a caravan alongside. The ultimate idyll; the place we all long for. Despite the extreme perspective, with a foreground rich in detail and a horizon far away in the distance, the entire photo is extremely sharp and has a hyper-real feel to it, especially if you get a chance to see the original, which measures 2.5 square meters. The incredible depth of field in these huge photos is created using a special lens mounted on a large-format (4x5") analog camera. The negatives are scanned before being processed digitally, and the finished photos are mounted behind Plexiglass on Dibond aluminum panels.

Looking more carefully, we eventually twig that the grains of sand are far too big, and that there is no path to the house. Some things in the scene just don't add up, and the idyll turns out to be a carefully

constructed illusion. The buildings, vehicles and trees in Wrede's photos are models that are often only the size of a shoebox, and many of them are standard pieces from Faller Models. The initial concepts take shape as doodles on paper, and Wrede then builds the model and looks for the right landscape in which to set it. He often finds what he is looking for near his home in northern Germany or on one of the North Frisian islands.

These 'real landscapes' do not represent any actual location, yet they seem familiar. The diner on the edge of a canyon in the middle of nowhere could have come from any American road movie, the apartment buildings next to the hills really do look like the last place anybody would want to live and the house perched on the mountainside is just the kind of splendid isolation we all dream of. The photos play on the way we are used to seeing things and are, in a way, a kind of visual quotation.





Canyon
(2007, 170×240 cm)

Playing around with miniaturization and the aesthetics of modeling is a big trend in the world of movies and photography. The films used to introduce each country at the 2011 Eurovision Song Contest are just one example of the widespread use of fake miniature effects. But while many people like to experiment with making reality look like a model, Wrede works the other way around, making models look like part of the real world. The large format of his works makes them quite different from those of his colleagues, too. Images of models usually look best when reproduced as small as possible, but the size of these photos reveals every flaw and inaccuracy. These images are not perfect fakes – instead, they cleverly toy with our perceptions of reality.

Thomas Wrede discovered his affinity for photography while studying for a fine arts degree. At some point along the way, the photographs he was taking in preparation for his paintings took on a life of their own. The 'Real Landscapes' project began in 2005 and is

sure to run for a few more years yet. Wrede has made a living from his photographic art for the last decade, though he says every year presents a fresh challenge. He usually issues two series of each image: one in large format with five prints and a 95×120cm run of seven prints. Buyers may be individuals, banks or insurance companies and, most recently, he sold one of his works to the German Ministry of Food, Agriculture and Consumer Protection. (jr)

Links

www.thomas-wrede.de

www.galerie-wagner-partner.com/artists/thomas-wrede/works

www.faller.de/App/WebObjects/XSeMIPS.woa/cms/page/

pid.14.16/lg.en/ecm.p/Home.html

www.beck-eggeling.de/en/new_quarters/artist/thomas_wrede



Lakeside Landscape
(2007, 140×180 cm)







House in the Mountains
(2007, 120×240 cm)



Skyscrapers
(2008, 95×180 cm)



Dari King Drive-In
(2007, 170×220 cm)





Ralph Altmann

Keep it Real

Effective Color Management from
Exposure to Print



The digital world is built on three colors. All you have to do to capture a digital photo is take a certain amount of red, blue or green – from zero for none up to 255 for ‘all there is’ – stir thoroughly and marvel at the unique colors the process produces. The 256 tonal values per color channel that 8-bit color depth provides give us 16.7 million different colors to play with and, if we work with 10-, 12- or 14-bit colors, this number increases still further into unimaginably complex realms that produce differences in color tones that are indistinguishable to the human eye.

Such enormous numbers of colors are great if we want to produce smooth color transitions, but even the most comprehensive palette isn’t guaranteed to contain all visible colors.

The quality of any mixture can only ever be as good as that of its ingredients, so a color that is composed of ‘impure’ red, green and blue components can never be as pure and strong as the brightest red, green and blue tones that our eyes can see. Impure primary colors always produce an incomplete spectrum of secondary colors. No monitor, printer or photo lab is capable of reproducing pure, bright colors as they exist in nature.

But this is only a subsidiary problem. The real problem – and the reason why color management systems are necessary in the first place – is that just about every imaging device in existence has a slightly different idea of what ‘red’, ‘green’ or ‘blue’ actually means. If two digital painters use exactly the same recipe but slightly different ingredients, the resulting colors will not be the same. Take a look at the TVs on display at your local electronics store and check out the differences in color they produce even though they are all displaying the same test picture.

What we have to do is define our recipe more precisely to make each color explicitly reproducible. It is not sufficient to simply say how much red, green, or blue we require – we also have to define how much of *which* primary color we need. This is the task assigned to color profiles.

If you want the deep green of a meadow to look just as luscious in print or on a monitor as it did when you focused on it through your camera’s viewfinder, color management is what you need. This article explains why terms like ‘green’ or ‘red’ are insufficient descriptions of color and how to set up your digital photo workflow to keep your colors true from the moment you release the shutter to the second you hold a perfect print in your hand.

Color Profiles

A monitor profile contains information that defines the strongest red, green and blue tones that the monitor can reproduce within a reference color space that contains precise definitions of all theoretically visible colors. Printer profiles work on the same principle, but are slightly more complex because they usually mix four (cyan, magenta, yellow and black) or more component colors with the white of the paper to produce the printed colors. Ideally, monitors would also use four component colors to produce an image, but 'real' cyan cannot be adequately mixed from just red, green and blue, which is why it is missing from all monitors.

Not only output devices, such as printers and monitors, but also all capture devices (i.e., cameras, scanners and photographic film) capture the colors contained in incident light in their own particular and often idiosyncratic way. However, in the case of capture devices, the color production process is performed the other way around. The jumble of colors in the subject is captured using a sensor that uses a matrix of colored filters to mix the appropriate amounts of our old friends red, green and blue into an interpretation of what it sees. The software algorithms used to perform these calculations and the pattern of the colored filters vary from manufacturer to

manufacturer, from camera to camera and even from sensor to sensor.

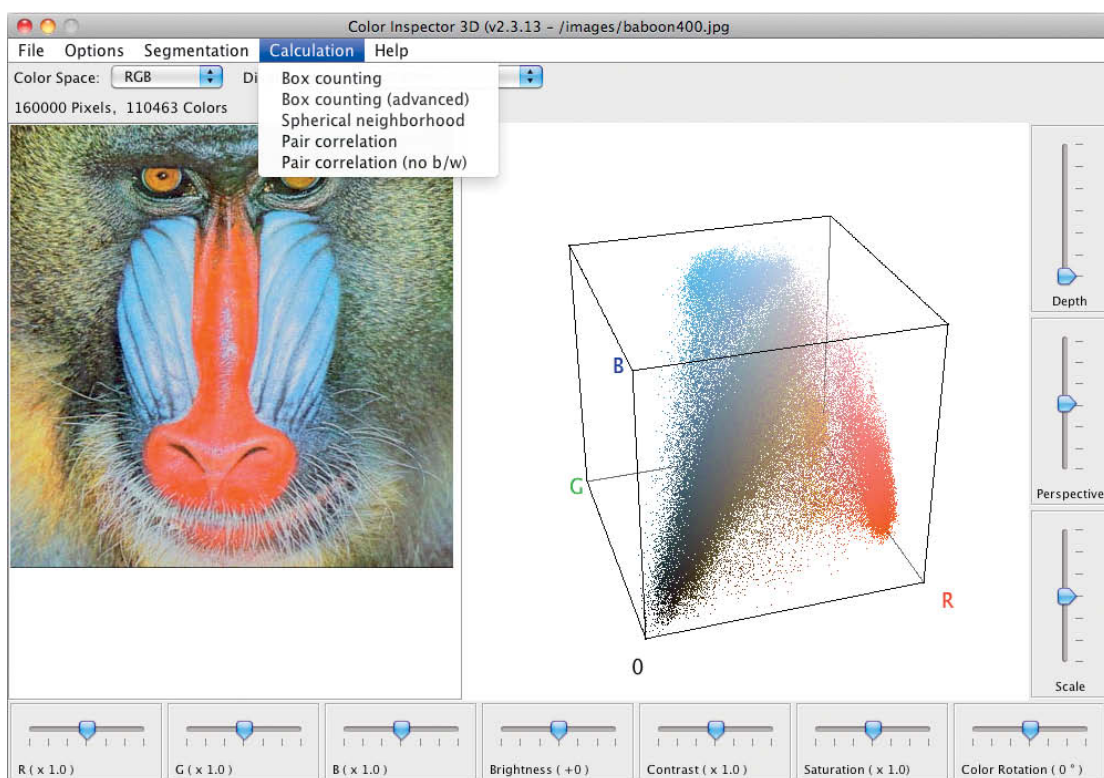
Color Management

What color management does is translate between all these different color recipes. If a camera outputs the RGB values 170/55/67 for a particular color, the color management process calculates the 'true' color values for a device-independent color space based on the camera's own profile. It then calculates which values are necessary to reproduce the same color on a monitor or other device. In practice, the first stage of the color management process actually takes place in the camera and maps the color values captured by the sensor into either the sRGB or the AdobeRGB color space.

If all camera, monitor and printer manufacturers were to agree on a single standard working color space for their products, we wouldn't have to deal with color management at all – the whole process would simply take place invisibly in the background. Many imaging experts dream of such medium-independent color management, although this cannot be achieved at a high enough level on the basis of the sRGB and AdobeRGB color spaces. You are probably already asking yourself why we don't just use the reference color space already mentioned

for all devices. This would indeed represent something approaching an ideal solution, but would require the entire digital image capture process – from camera hard- and software through image processing software to all aspects of the output process – to be adapted to work on a 16-bit basis. A reference color space that contains all truly visible colors would have to be extremely large to cope with the irregular form of the color space of the human eye. A large part of such a color space would go unused but still requires memory bits to exist. In this context, the differences between the 256 different tonal values present in the 8-bit system would become too obvious. If you want to build a house using a predefined number of stairs, there is a limit to how tall the house can be before each step becomes too high to climb comfortably.

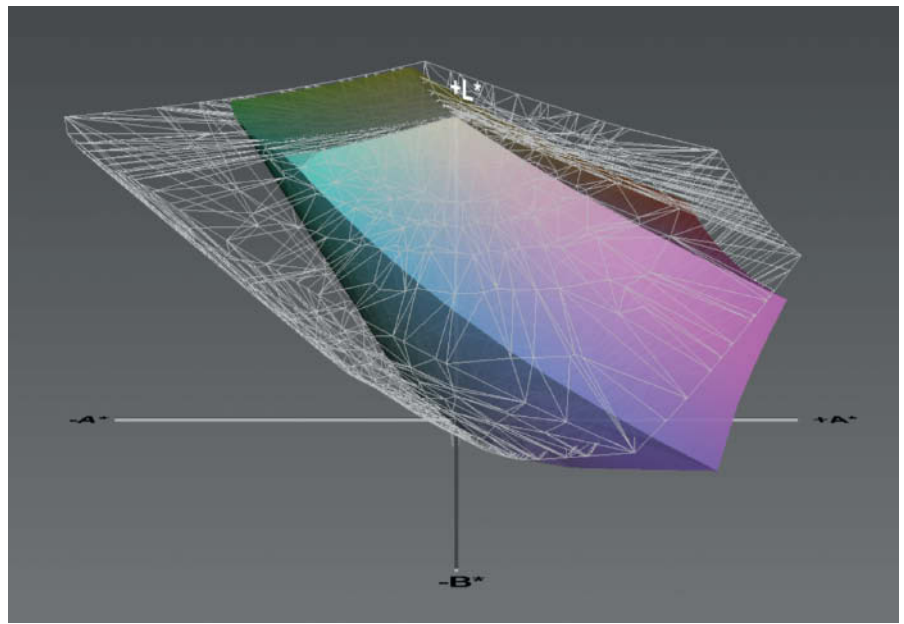
The dilemma of wanting to use the largest possible color space while keeping the transitions between tonal values as smooth as possible has so far prevented the invention of a universally satisfactory solution to the problem of color management. Color management in its current form is a complex, imperfect and often confusing system. It is inconsistent and is at best something of a crutch - although the situation today is significantly better than it was 20 years ago.



The freeware *ColorInspector 3D* displays the colors contained in an image in four different color models. However, color profile support and a tool for comparing the results with standard reference color spaces are only available in other, commercial programs such as *Colorthink* (www.chromix.com).

Back then, the only way to produce consistent colors was using proprietary solutions that only a few specialists could understand. Nowadays, anyone with an affinity for IT can construct a perfect sRGB-based imaging workflow that produces better colors than any expert could have managed all those years ago. The following pages are dedicated to investigating the more challenging aspects of the color management process, although we won't completely lose sight of the sRGB workflow along the way. The aim of the exercise is to achieve a perfect reproduction of the colors you saw through the viewfinder on your monitor or in print.

We will begin by considering white balance and camera calibration, followed by monitor calibration techniques. We also need to make a number of system settings to ensure that all the devices and programs in the workflow understand one another, and this is the subject of the third major section of the article. The final section deals with processing for output and details our experiences with print services that claim to provide full color management support.



The grid in this illustration represents the eciRGB color space and the colored shape within it the sRGB color space. This comparison was provided by www.iccview.de, where you can also upload your own color profiles. The eciRGB color space is the same size as the NTSC color space used to calibrate and compare wide gamut monitors.

Authentic In-camera Colors

If your camera isn't capable of capturing colors accurately, the rest of the color management process turns into a guessing game. Unfortunately, camera manufacturers have differing ideas of what 'accurate' means, and often vary their definitions according to consumer taste. Asian photographers have a distinct preference for strong colors that are considered over-the-top in Europe and the US. If you are using a camera that can only output JPEG images, you will have to choose the camera preset that produces what you consider to be the most natural looking colors. If you are shooting in a RAW format, an exposure preset will only really influence the look of the image preview on the camera's monitor. These are often designed to look like the results produced by specific analog film stocks. You can then use a RAW converter to change the look or the white balance of your image to your heart's content without actually altering the original image data. In contrast, every change you make to a JPEG image alters the original pixels, and the 8-bit nature of those pixels doesn't give you much room for maneuver before editing visibly reduces the quality of the resulting image.

White Balance

White balance is just as important as the color characteristics of the image sensor, which captures the light reflected by the subject's surface. The actual color of this reflected light depends not only on the color of the subject itself, but also on the color of the light source illuminating it. It is only possible to make genuinely precise statements about the color of an object if you know the exact color (or better still, the spectral distribution) of the light source.

If you don't apply the correct white balance setting, a sheet of white paper will appear yellow if photographed under a conventional light bulb and will have a blue tinge if photographed in daylight. Auto white balance mechanisms assume that the brightest parts of the frame are lit by the dominant light source and only a few high-end cameras have light sensors that detect the color of the ambient light independently from the colors reflected by the subject. Most subjects contain bright details that directly reflect the illuminating light without altering its color and, because the human eye works on a similar principle,

the results usually correspond adequately to our visual expectations.

However, this method doesn't work at dusk or in artificially colored light and often produces images with an indeterminate lighting mood. Auto white balance is also inappropriate for use while shooting image sequences because it detects slight differences in lighting from frame to frame and alters the camera's settings accordingly even though the subject remains the same. You can alter and match white balance settings after shooting if you shoot in a RAW format, but not if you use JPEG. If you have to use JPEG, it is better to set the camera to set white balance manually before you begin shooting.

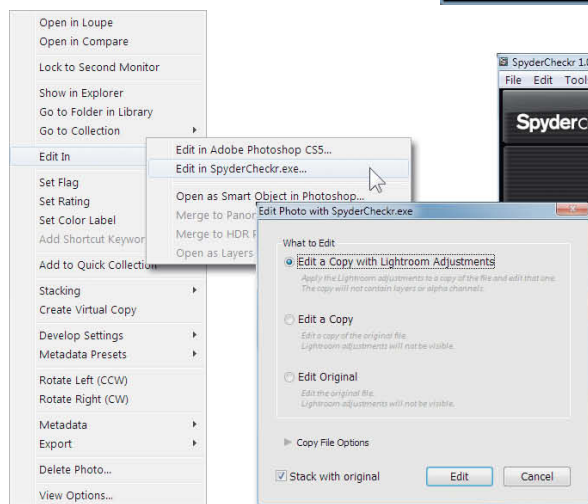
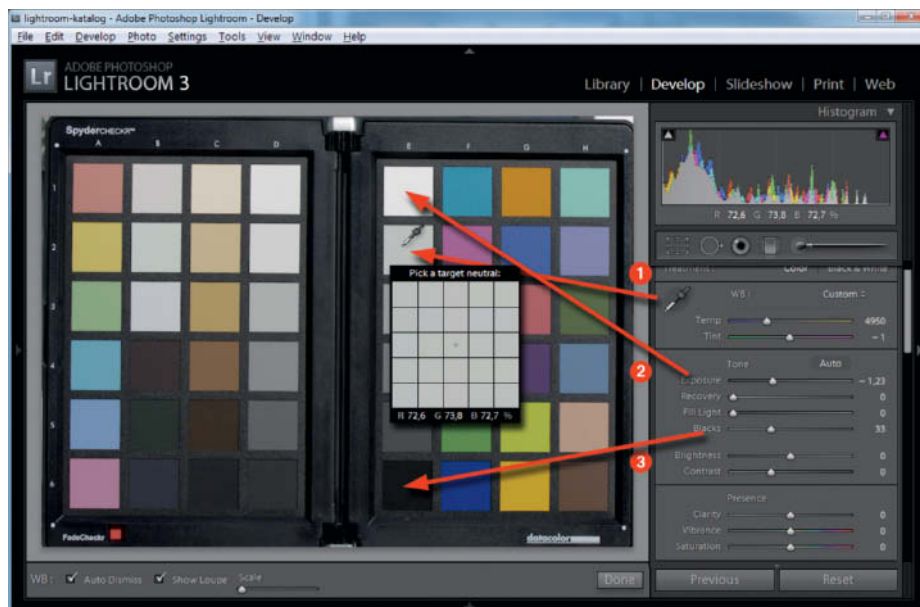
For the sake of precision, you should always take a reference shot of a gray card at the start of a shoot and every time the light changes. Color targets (see below) contain gray reference patches, although a dedicated, frame-filling gray card is better still. Many photographers simply use any old sheet of paper that happens to be on hand, but paper is not uniformly white and the bleaches it contains often react inconsistently to the UV component of incident light.

Correcting Colors using SpyderCheckr

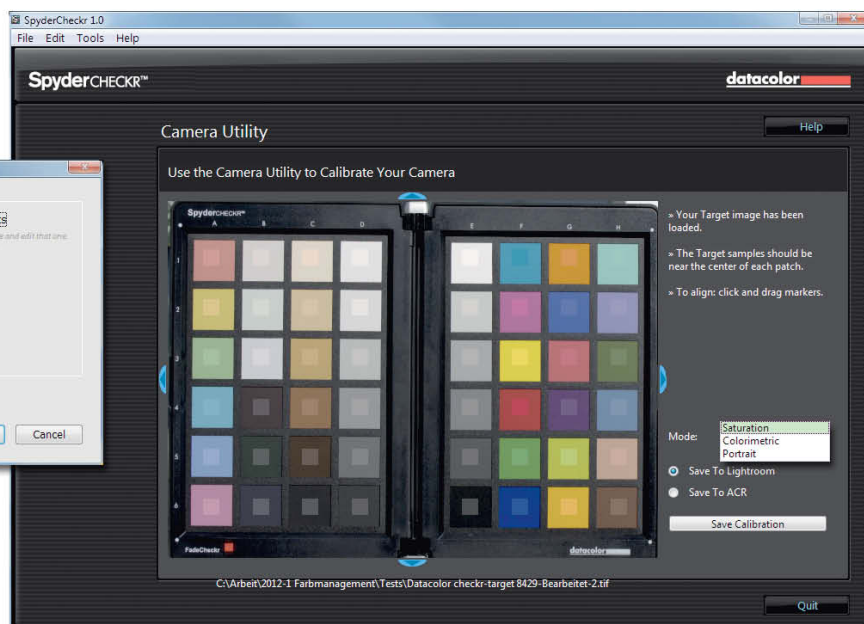
Step 1: In *Lightroom*, adjust white balance to match patch E2 using the eyedropper tool, then adjust patch E1 to about 90% using the Exposure slider and patch E6 to about 4% using the Blacks slider.

Moving the mouse over one of the colored patches displays that color's values in the histogram display, and you can then use the + and - keys to adjust the values.

In *Adobe Camera Raw (ACR)* you can achieve the same thing by selecting two reference points with the eyedropper and adjusting their RGB values manually to 230 and 10.



Step 2: Load your target image in *Spyder-Checkr* using the 'Open with' command. If you prepare your target image using *ACR*, you will have to save it in TIFF format and load it manually. You can now perform any necessary fine-tuning on the target's colors.



ICC Camera Profiles

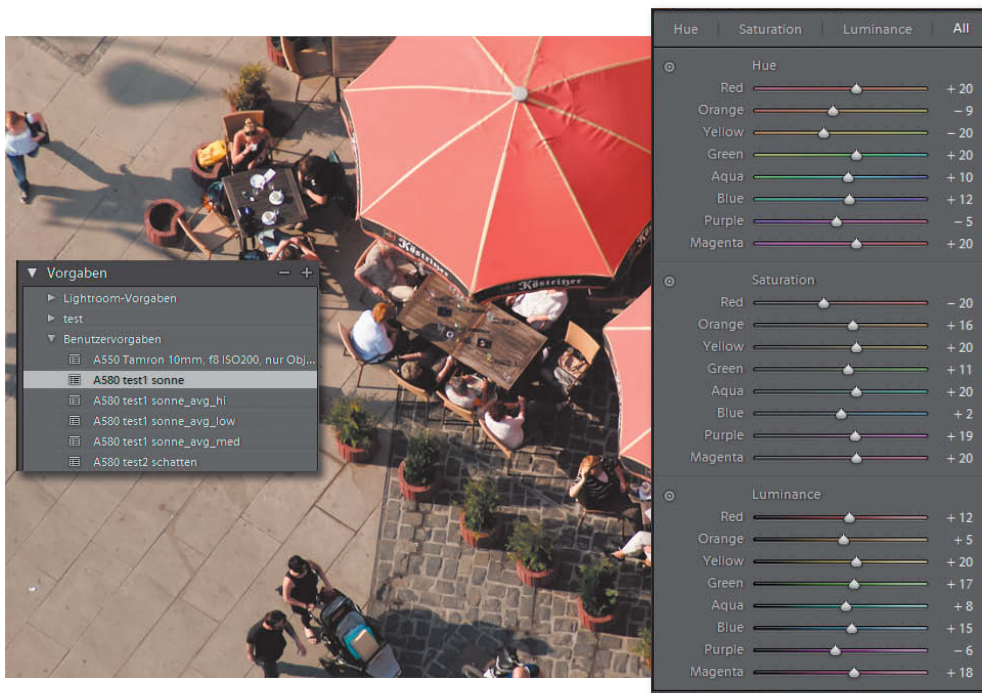
Color temperatures that vary from shot to shot make camera profiling and setting white balance quite tricky. Strictly speaking, ICC profiles are valid for only a single color, theoretically making it necessary to use a different profile for every shoot. For this reason, ICC camera profiles are generally only used in professional situations such as studio

environments in which the color of the lights is known and is unlikely to change significantly. There are, however, simpler solutions available for everyday photographic situations, and the following sections describe two of these. Both work with *Lightroom* and *Adobe Camera Raw*. Although both programs are capable of processing various image formats, we strongly recommend that you use RAW format for camera calibration purposes.

If you want to use DNG profiles, RAW is obligatory anyway.

Calibration using SpyderCheckr

Every fine adjustment to camera settings requires a subject with predefined colors called a 'target'. The following guide uses the SpyderCheckr package from DataColor. In this



Step 3: The newly created Lightroom User Preset affects only the HSL slider settings

case, the target contains 48 color patches attached to a foldable aluminum frame that protects the colors from wear and fading. The target includes a special 'FadeChecker' patch that changes color with cumulative exposure to light and warns you when you need to purchase a new color card.

The target has to be photographed under realistic conditions in even light without extraneous reflections. The manufacturer advises that as little blue sky as possible should illuminate the target if the reference shot is made in daylight, so try to shoot under some kind of shade if you are using the SpyderCheckr out of doors. Open your RAW image of the target in *ACR* or *Lightroom*, crop it if necessary, and adjust the tonal values and white balance as you would when processing any other image. If the camera and its internal processes are accurate, the RAW image of the target should now contain exactly the same colors as the original. If not, you can adjust the colors using the program's sliders, although adjusting one slider often affects the colors in more than one patch.

A simpler alternative is to use the *Spyder-Checkr* software, which does the same job virtually automatically. Once you have loaded your photo of the target, all you have to do is fine-tune the colors. You can then click the Save Calibration button to save the results as a new User Preset (in *Lightroom*) or a Setting (in *ACR*). Following a restart, the new preset will be available in the Develop module in *Lightroom*.

In *ACR*, you can either select a preset directly in the Presets tab, or select Load Settings or Apply Preset in the Preset tab's menu.

DataColor calls this procedure "Camera Calibration", although what it actually does is create a user preset that automatically adjusts *Lightroom's* HSL slider settings. These presets can be applied to photos shot with any camera, so be sure to include the appropriate camera name in the preset title. The advantage of this process is that you can change a preset's parameters and save it under a new name at any time, while the major disadvantage is that a preset is only really suitable for use with photos that were shot under exactly the same lighting conditions. If you have created two new presets for different lighting situations, the *SpyderCheckr* software can interpolate three intermediate presets with values that lie between the ones you have captured. This can make things quite complicated, but thankfully *Lightroom* does allow you to arrange presets in folders and sub-folders.

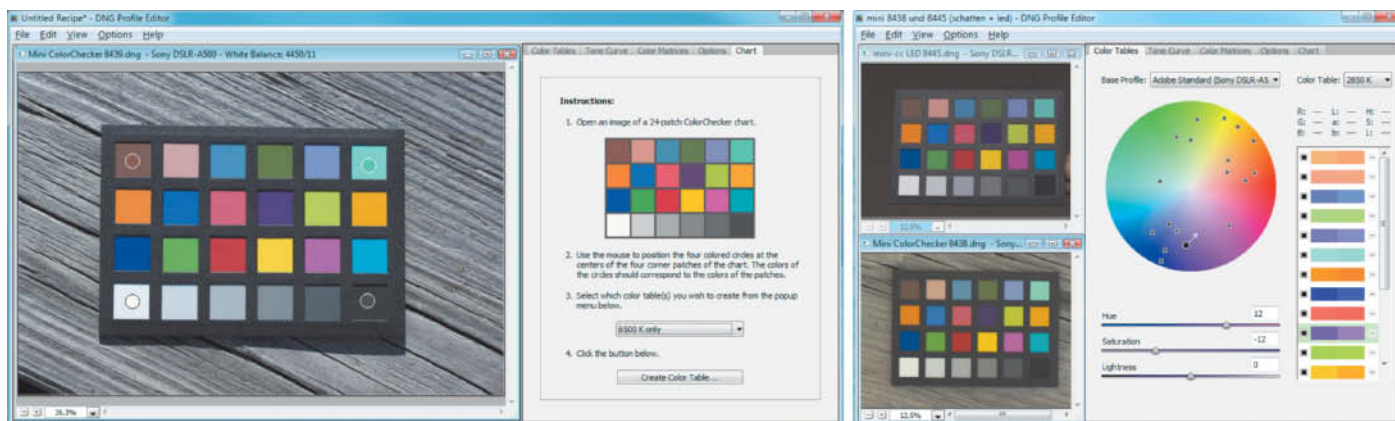
The sensitivity of variations in color temperature has its uses, and you can deliberately use the *SpyderCheckr's* blue- and red-tinged white patches to

adjust white balance to give portraits a warmer or cooler look. DataColor compares this methodology with the weak colored filters that analog photographers used to use to adjust skin tones. Admittedly, this kind of technique has less to do with color management than it does with creative photography, but can nevertheless be used to create consistently reproducible results.

In *Lightroom*, calibration presets can be applied to multiple images or selected as a Develop Setting during image import. If you use the Develop > Set Develop Settings command, you can apply presets automatically according to camera model, or even serial number if you are using more than one camera of the same model. Note that this approach saves not just the HSL slider settings, but rather all of the current Develop module settings.

Device calibration targets are available in various sizes





The Adobe *DNG Profile Editor* automatically creates a manually adjustable color correction table (shown on the far right) from an image of a ColorChecker target. You can also create a dual illuminant profile using two photos of the ColorChecker taken under different lighting conditions.

Calibration using DNG Profiles

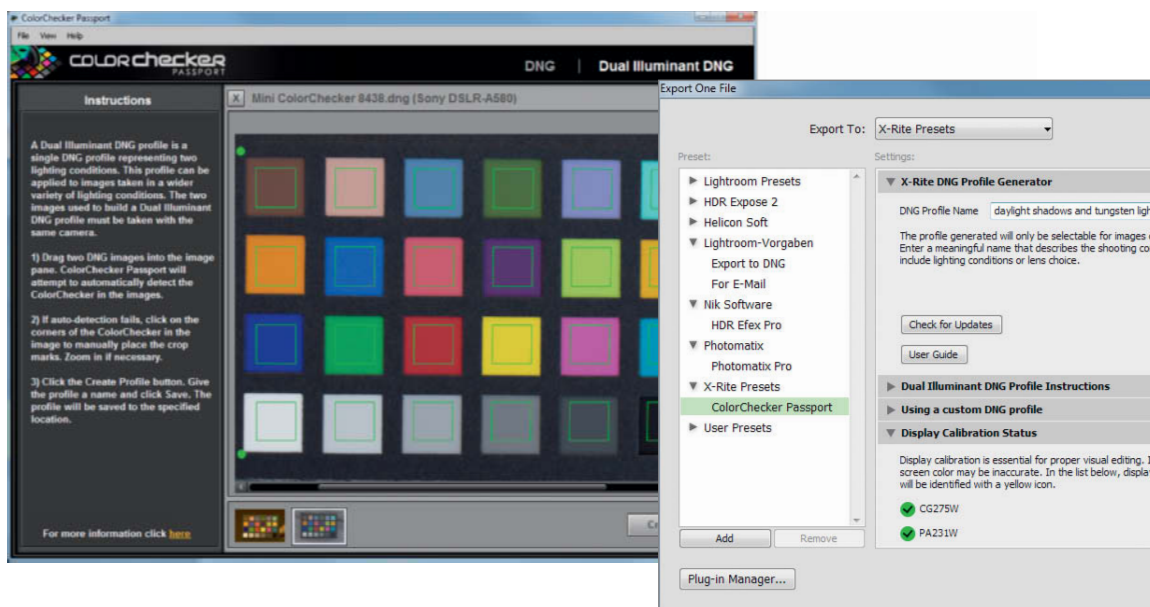
The *Lightroom* Develop module contains the same Camera Calibration settings as the eponymous tab in the *ACR* interface, where you can select one of the standard Adobe camera profiles included with the software. The profiles themselves are stored under ProgramData\Adobe\CameraRaw\CameraProfiles\Adobe Standard, and contain the settings that the color interpolation performed by the Adobe demosaicing algorithm is based on. A number of additional profiles for various mid-range and high-end cameras are available from the Adobe website. These are based on the color characteristics of the various looks that are programmed into the camera manufacturer's own shooting presets – for

example, a 'Portrait' profile will reduce red saturation, while 'Landscape' and 'Vivid' profiles tend to have the opposite effect.

Creating your own camera profiles is much more interesting than using manufacturers' presets, and Adobe has come up trumps with its free *DNG Profile Editor*, which enables you to create and adjust profiles using images of any target you choose. A faster, automatic way to create camera profiles is to use the X-Rite ColorChecker package, with targets available in Mini and Classic sizes for US\$75-99. As an alternative to the Adobe *Profile Editor*, X-Rite also markets its own *ColorChecker Camera Calibrator* software (also known in some markets as the *ColorChecker Passport*), which is available for free from the X-Rite website. The Windows version of the software includes a

Lightroom export plug-in that can be downloaded separately for use with Mac systems.

The *DNG Profile Editor* can be started directly without prior installation. Although DNG stands for Adobe's own Digital Negative file format, you don't have to adapt your workflow to DNG to use profiles created using the tool – you only have to export your target image in DNG format so that it can be loaded into the editor. Then simply switch to the Chart tab, place four markers in the like-colored patches in the target and click the Create Color Table button. The program then switches to the Color Tables tab, where all 24 target colors are displayed in 'before and after' versions alongside their positions on a color wheel. Each target color can be adjusted using the



ColorChecker Passport supports step-by-step profile creation and also works as a *Lightroom* export plug-in

HSL sliders, although this is seldom necessary. Finished profiles can be exported to the appropriate folder via the File menu and are available in the Calibration panels of *ACR* and *Lightroom* after the next restart. You can save any changes you make to a profile as a 'Recipe' that you can load and continue to fine-tune later. An existing profile can also be adjusted by loading it into the Color Tables tab as a 'Base Profile' while selecting the colors that you want to adjust from a separately loaded image. Base Profiles play no part in the automatic creation of profiles using ColorChecker targets.

Adobe DNG profiles actually consist of two component profiles adapted to match color temperatures of 2850 and 6500K (Kelvin). The program simply interpolates values for other color temperatures, enabling DNG profiles to cover all conventional lighting situations. *Profile Editor* can also be used to create new dual illuminant profiles. All you have to do is shoot a target photo under each of the two

light sources, save them in DNG format and automatically create two color tables for 2850 and 6500K values in the Charts tab. You can then save the new profile in the usual way.

The program's Color Matrices tab includes three sets of Primary Color sliders as well as temperature and tint White Balance sliders and enables you to create profiles for extreme lighting situations, such as for digital cameras adapted for shooting infrared photos. There is also a Tone Curve editor in its own tab.

The X-Rite *ColorChecker Passport* software is not as versatile but is much easier to use. It can be used to create dual illuminant profiles and its built-in *Lightroom* plug-in saves you the effort of converting your target shots to DNG format. The package also includes monitor calibration functionality, but doesn't allow manual profile adjustments. Finished profiles are much less complex than their Adobe counterparts, and contain just a simple color matrix and one look-up table (LUT) of about 100 values. In contrast, an

Adobe DNG profile contains four separate color matrices and more than 2,200 reference points. In spite of its obvious advantages, this complexity doesn't guarantee high-quality profiles, especially if you consider how accurate today's cameras are (i.e., their high tolerances and often negligible color discrepancies).

DNG profiles are only valid for the camera they were created with and are only visible in the Adobe Calibration panel if a photo is selected that was shot using that particular camera – a great help when it comes to retaining an overview of your profiles. The *DNG Profile Manager* is another great management tool that you can download for free when you register the purchase of a ColorChecker target. To apply a profile during import into *Lightroom*, simply include it in the standard Develop settings, as described for the SpyderCheckr above. Profiles that contain only calibration settings are best suited for application to multiple images.

sRGB or AdobeRGB?

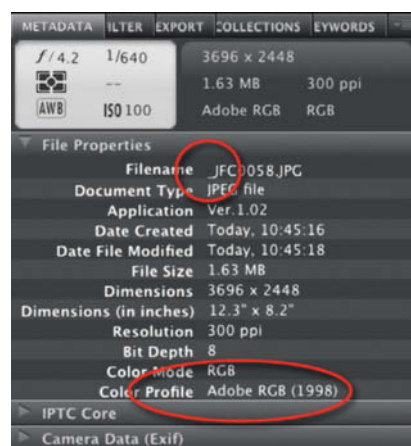
Most mid-range and high-end cameras offer the choice of shooting in the sRGB or the larger AdobeRGB color spaces. If you shoot in a RAW format, the color space you choose is less relevant, as the final profile for an image is only created during RAW development. The profile you select in the camera serves only as a suggestion and to provide colors for the monitor display. If you are shooting in JPEG format, the profile you choose is set in stone, and any adjustments you make after shooting will reduce the size of the resulting gamut.

The great advantage of using sRGB is its ease of use, which makes it a very close approximation to genuine, user-friendly medium-independent color management. Image files that don't have a profile of their own are usually interpreted as having been shot in the sRGB space, and most non-calibrated monitors and printers produce acceptable colors. Wide gamut monitors are still fairly rare, but have to be calibrated to produce usable colors. sRGB images can also be edited to ICC-compatible standards using older (often cheaper) image processing software. Inclusion in a fairly simple, closed color management workflow and the embedding of sRGB profiles in all output files (in order to avoid confusion) are often more important than

squeezing the very last drop of saturation out of an image. Even if they are capable of more, most machines used by professional printing services (the final link in the imaging chain) are limited to processing sRGB files by default.

The major advantages of AdobeRGB are the slightly larger gamut and its acceptance as something of a standard for press and agency work. However, the gamut is still too small for most inkjet and photo lab printers (and probably soon for high-end monitors too).

The modified gamma curve used by sRGB to reproduce deep shadows is better than the standard curve used by AdobeRGB, while *eciRGB_v2* uses the (supposedly) even better L* curve. However, *eciRGB* is not yet available as a setting in any current camera firmware. If you want to get the most from your camera and it supports RAW shooting, then use it – you can convert your images to any color space (including AdobeRGB) later. sRGB is perfectly adequate if you shoot mainly for Web publication or printing at a sub-fine art level.



Today's digital cameras no longer embed a standard profile in image files, but instead simply write the name of the appropriate profile along with the filename to an Exif tag. An underscore at the beginning of a filename indicates AdobeRGB, while filenames without underscores are stored as sRGB files. This system works well until a file gets renamed. Image processing software should adjust the contents of the Exif tag every time a profile change takes place, but the only way to be really sure that an image is saved correctly is to embed the profile.

Authentic Monitor Colors

Cathode ray monitors are a perfect example of additive color synthesis. Three beams of electrons bombard red, green and blue phosphorescent dots. The mixture of these produces the colors that are visible on the screen, while their brightness depends on the strength of the electron beam, which itself depends on the strength of the voltage applied to the cathode. This is the technical origin of the famous gamma – i.e., the inverse non-linear distortion of brightness curves in still or video images. Zero voltage means zero brightness (i.e., black), while full power for all three channels combines to produce white light. The color characteristics of this type of monitor depend entirely on the nature of the phosphorescent colors used in their manufacture, but even the highest quality phosphors cannot reproduce all visible colors. Bright cyan requires the presence of a ‘negative’ red value, which this technology doesn’t support. In principle, the same is true of LCD monitors and projectors, although the spectrum of the backlight color also plays a role in determining the overall color characteristics of these types of device. LCD monitors work on the basis of a hybrid technology. The red, green and blue filters located in front of the more or less transparent liquid crystals first have to filter out the color of the backlight using subtractive color synthesis techniques before they use additive color synthesis to mix the waves the filters allow through to create the colors displayed on the screen.

Monitor Calibration

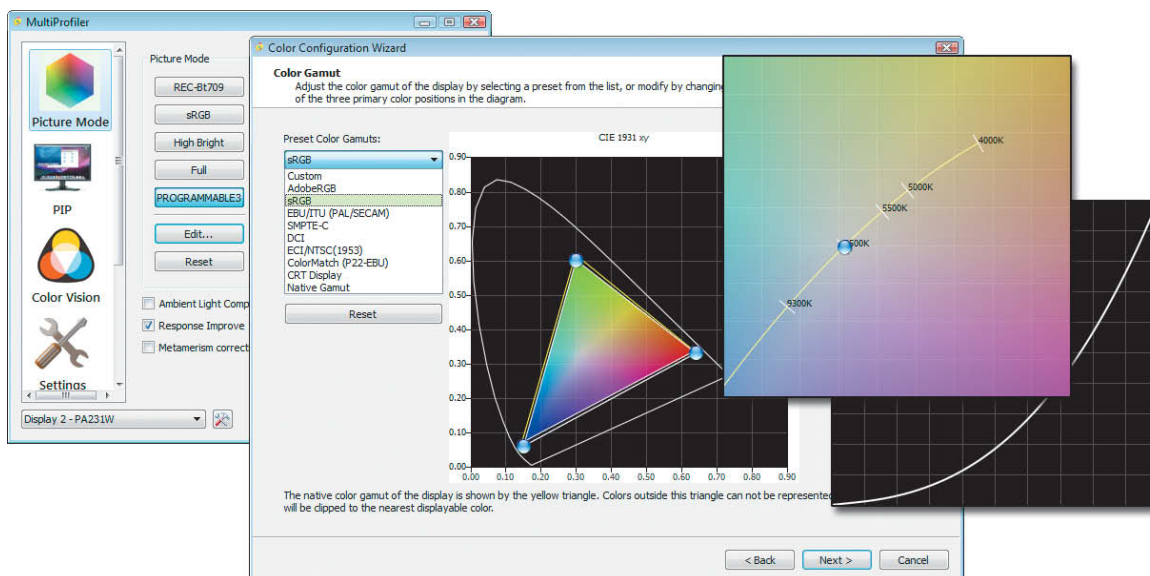
The process of setting up a monitor to produce optimum colors is called calibration, and initial calibration takes place at the factory. The process ensures that the brightness of the monitor image follows the control voltages applied to it according to the values contained in a specific curve, and also makes sure that gray tones remain neutral at all brightness settings. It also ensures that displayed whites have a consistent color temperature. The appropriate values required to make these kinds of corrections are stored in ‘look-up tables’ (LUTs) that are an integral part of the device’s circuitry.

Similar tables are used to compensate for differences in brightness in a monitor’s backlight. The LCD cells that are located in front of brighter parts of the backlight are darkened permanently and, when a particular RGB value is sent to a pixel, the monitor’s circuitry checks the red, green and blue color look-up tables (LUTs) for possible correction values and then checks in an additional large table for pixel-related corrections. LUTs are the digital equivalent of the dials and resistors that used to be used to regulate analog monitor signals.

The LUTs built into modern high-end monitors can be manipulated using computer software – a process known as hardware calibration. However, ‘software calibration’ performed by manipulating a computer’s graphics card is more common.

LUTs are written to appropriate memory banks in the graphics card, but are limited by the fact that these usually only support 8-bit color depth. For example, the brightest possible white tone in an 8-bit digital image has RGB values of 255, 255, 255. In order to prevent this color being displayed with a strong blue color cast, a monitor’s blue channel has to be regulated to a value of around 220 to produce a realistic overall color temperature of between 5000 and 6500 K. The limitations of 8-bit color depth tend to make the graduations between different levels of brightness coarser and therefore more easily visible. If we extrapolate 8-bit color values to a 10-bit scale before correcting them, the resulting graduations will be finer, even if they are scaled down again for display on an 8-bit panel. Today’s high-quality, graphics-grade LCD panels are controlled using 10-bit firmware and a simple trick called Frame Rate Controlling (FRC). The individual LCD cells in such a panel are only actually capable of displaying 256 different grayscale values, but are switched on and off extremely quickly according to a predetermined pattern to simulate finer tonal differences.

LCD panels with true 10-bit control systems are rare and expensive, but graphics cards with 10-bit LUTs and 10-bit signal transmission technology (such as ATI FirePro and nVidia Quadro) are nowadays standard fare in professional graphics circles. In order to ensure that 10-bit control signals actually reach the monitor, the graphics card has to be



The NEC SpectraView range proves that monitors can produce stable colors over long periods of time without resorting to regular calibration. The *MultiProfiler* software enables the user to make precise color space, color temperature and tone curve settings without the use of additional calibration hardware.

What to Look Out For when Purchasing a Monitor

Viewing Angle Independence: A large color space is no use if the colors on the monitor screen change with the angle of view. Only the best IPS and PVA panels are used in high-end monitors.

Large Color Space: The reproducible color space depends largely on the backlight technology used. RGB LEDs are capable of reproducing the most colors but are also the most expensive. A cheaper way to produce acceptable colors is to use LEDs just at the edges of the screen. White LEDs produce impure, pseudo-white light and are inferior to traditional cold cathode (CCFL) technology. Most mid-range and high-end wide gamut monitors use CCFL backlight technology.

and DisplayPort. This technology is not yet available for Macs.

Internal Signal Processing: Performed using look-up tables (LUTs) that contain monitor settings and correction values. The greater the LUT bit depth, the more precise the corrections they can make without the loss of intermediate colors. Most mid-range monitors use three 'one-dimensional' LUTs (one for each color channel) with 10- to 16-bit color depth. 3D LUTs are channel-independent and provide more accurate color reproduction with consistently neutral gray tones.

Hardware Calibration: The correction values produced by the monitor

black point value essential for providing sufficient contrast. About 0.2 cd/m² (candelas per square meter) is a good reference black point value, while maximum brightness should be between 250 and 350 cd/m².

Uniform Illumination: Monitors that use edge backlight technology are particularly prone to uneven illumination – a problem that can be counteracted using specially formulated, pixel-based correction tables. This involves measuring screen brightness section by section during calibration, resulting in correction values that attenuate the current in the LCDs in areas that are too bright. In reality, this means that images are displayed darker in these areas.



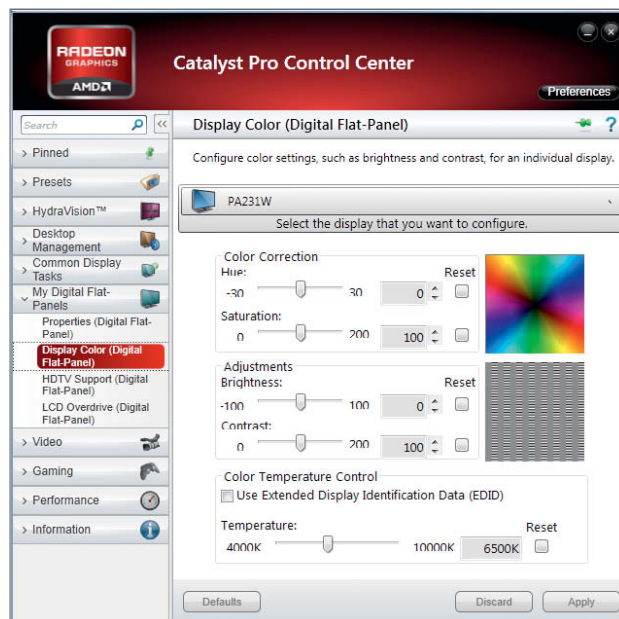
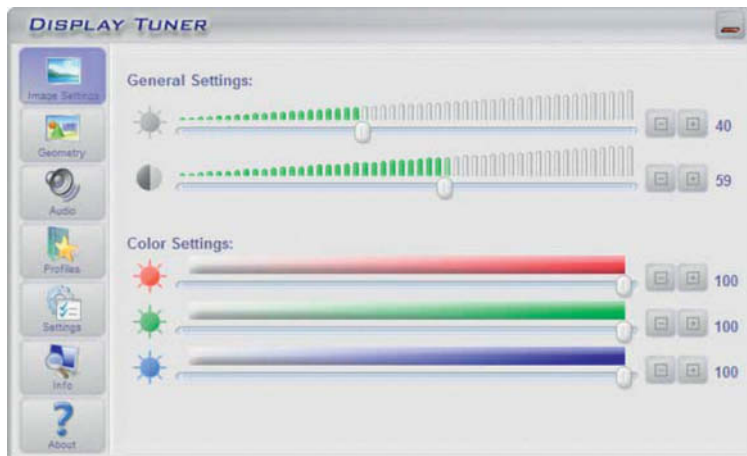
The Fujitsu P27T IPS wide gamut monitor (left) produced great results in a recent c't test and is good value at around US\$900. The 23-inch standard gamut NEC MultiSync PA231W (right) costs about the same. The larger monitors in the NEC MultiSync range are all wide gamut models.

Panel Bit Depth: The greater the bit depth of a monitor, the smoother the transitions between colors will be. 8-bit color depth (with 256 grayscale values per channel) is the current industry standard, and most '10-bit' monitors use 8-bit panels and FRC technology to simulate greater resolution. Native 10-bit panels, such as the Eizo CG303W or the NEC PA245W, are rare and expensive. The advantages of 10-bit panels only come to the fore if your system is capable of producing 10-bit signals, which requires the use of a 10-bit graphics card

calibration process are stored in the monitor's high-bit-depth LUTs rather than in the 8- or 10-bit LUTs in the graphics card. Graphics cards are designed to control systems that have already been calibrated and don't perform corrections themselves.

Black Point and Maximum Brightness: These two values represent a monitor's (statistical) maximum range of contrast. Most graphic artists set their monitors to 50 percent brightness or less, making a low

Comparison Website: A comprehensive database with detailed background information on a wide range of LCD panels and monitors can be found at www.tftcentral.co.uk. It is simplest to search for your desired panel size and quality under tftcentral.co.uk/articles/panel_parts.htm (for example, 10-bit IPS with 100 percent AdobeRGB gamut) and copy the appropriate panel description to the 'Panel' search box at tftcentral.co.uk/panelsearch.htm. This produces a list of monitors that contain your chosen panel type.

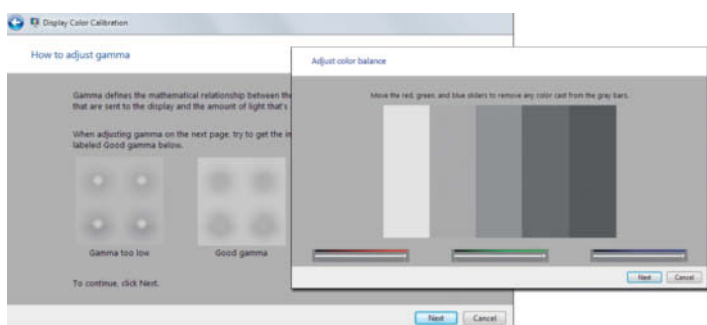


All parameters that can be adjusted via a monitor's on-screen display (above) are written directly to the device's hardware and thus qualify as a form of hardware calibration. Take care when making changes to the settings in a graphics card's control panel (above right). These alter the card's LUTs and can make it impossible to calibrate a monitor correctly using third-party devices.

connected to the DisplayPort, and your computer's operating system and the display software have to support 10-bit monitor output. So far, this only applies to Windows 7 (not Mac) and *Photoshop CS4* (and later). DVI cables are only capable of transmitting 8-bit instructions.

And what is all this effort good for? This issue's free DVD includes a test image that you can use to check how well your monitor resolves fine tone gradations. It is important that the full color depth of your images is displayed on your monitor, and hardware calibration achieves visible improvements.

The difference between 8-bit and 10-bit processing was not immediately obvious on our Eizo ColorEdge CG275W test monitor (hardware calibrated using 16-bit LUTs) – probably because this particular model produces smooth color transitions anyway. Our Fujitsu P27T-6 IPS test monitor (software calibrated with internal 12-bit processing) clearly benefited from 10-bit signal transfer. Both models have 8-bit IPS panels with 10-bit FRC. Really clear differences and noticeably smoother color gradations are still rare in everyday use.



This illustration shows the two Windows 7 test images used for visual monitor calibration (above) and downloadable test images from www.simplefilter.de for making gamma, white point and black point settings (below)

Monitor Profiling

Monitor calibration using a graphics card's LUTs is not strictly part of the color management workflow, but a badly calibrated monitor can affect color consistency to an extent that even the best profile cannot offset. This is why most programs first attempt calibration before analyzing a monitor's color behavior for the creation of an ICC profile. Users can enhance the potential success of the calibration process by making appropriate brightness, color temperature and contrast settings on the monitor itself (provided, of course, that it has controls or an OSD for doing so). All settings that you make on the monitor itself are a kind of 'hardware calibration' that doesn't involve altering the LUTs in the

graphics card. Any anomalies that cannot be remedied in the hardware or via the LUTs are then recorded as deviations from the reference value in the monitor profile. The profile will also contain the monitor's RGB primaries (in the XYZ color space), an ideal white point, a gamma correction curve and often a large color correction table. The particular values for the graphics card's calibration LUT are also part of the profile and are loaded either at system startup or when the profile itself is activated. To do this, most calibration programs are equipped with an autoloader that is located in the Startup folder on Windows systems.

Believe Your Eyes

Although your own eyes are by no means perfect, they are the yardstick for your success and are fine for performing an initial visual calibration. Your targets are created by your display software anyway, and many image processing programs are equipped with 'visual calibration' functionality, as are Windows 7 and OS X.

These tools all work on the same principle, and use test images to help the user set white and black points that preserve detail in bright and dark image areas while displaying neutral grays (with no color casts) and a gamma value that suits the current workflow. The black and white point and gray value adjustments are usually made on the monitor (i.e., hardware calibration) and only the gamma correction values are stored as part of the ICC profile, which is used to load them into the graphics card's LUT.

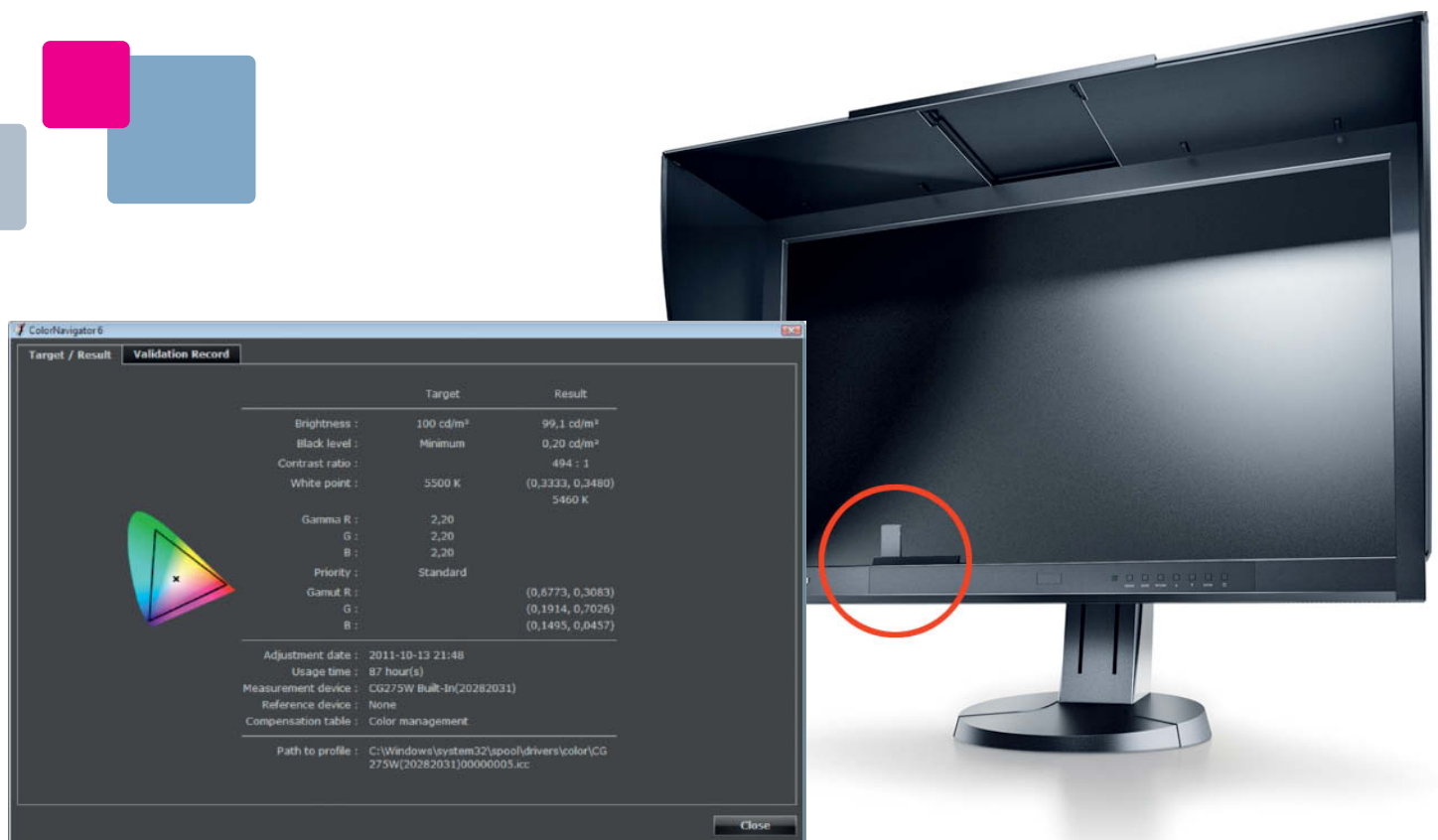
But that's it as far as visual calibration is concerned. Gamma correction is limited to a narrow range of brightness values, and the ability of the human eye to accommodate makes it virtually impossible to set color temperature and color space values or judge luminance accurately.

Whatever you do, don't be tempted to 'calibrate' your monitor using the 'DQ test cards' used by many print services. The idea is that you adjust your monitor to match the colors in the test print, but what this actually ends up doing is calibrating your monitor to match the color profile of one particular

commercial printer. This pseudo-perpetual soft proof is fine if you only want to work with that one particular service, but is guaranteed to produce false colors as soon as you view images that were profiled elsewhere.

Don't Guess, Measure!

A dedicated colorimeter is quite cheap to buy and is more precise than visual calibration. We recommended you use one if you are serious about your image processing. We tested the Datacolor Spyder3 and basICColor Discus models. Both devices are sold as colorimeters, although basICColor claims that its product is as precise as (or even more precise than) some spectrophotometers. This difference is evident in the price difference between the Spyder3 (about US\$160) and the Discus (US\$1300). Software is included in the Spyder3 package, whereas it has to be purchased separately for the Discus. The *basICColor Display* calibration software (about US\$120) is more sophisticated than the Datacolor offering and can be used with other



You don't need a separate colorimeter to calibrate the Eizo ColorEdge CG275W. This model has a built-in calibration sensor that folds out when needed. This US\$3,300, 27-inch monitor can be hardware calibrated without the use of a computer by way of a 16-bit 3D LUT. The proprietary Eizo *ColorNavigator* software can also be used with third-party colorimeters.

Recommended Monitor Settings

Brightness: This setting depends on the brightness of your surroundings. If you position your monitor in a darker part of your room and face it away from any windows, 120 cd/m² (or even less) should be sufficient. Some monitors have ambient light sensors that automatically adjust brightness to match the situation – a feature that is anything but helpful when setting a color managed workflow. The color sensitivity of our eyes also depends on the brightness of the image being viewed.

Color Temperature: 6500 K (D65) is often recommended for photographic purposes, while 5000 K (D50) is an widely used value for pre-press work. D65 looks better in artificial light, whereas D50 looks better in daylight. If your monitor doesn't happen to be located right next to a standardized

light box, the color temperature you set is not that important and your eyes will quickly compensate for any anomalies. 5800 K is a good compromise that works in a variety of ambient lighting situations.

Gamma: Select the gamma value for the working color space of the majority of your images. sRGB, AdobeRGB and ProPhoto RGB all have the same gamma value of 2.2. The luminance value in the L*a*b* color space – written L* and pronounced 'L-star' – has a similar effect to a gamma value of 2.2, but better visual linearity. Some monitors and calibration programs offer L* as an option, and this is a good choice if you are working in the eciRGB v2 color space. Note that eciRGB v1 uses a gamma curve with a value of 1.8.

Color Space: Only if your software is fully color management-compatible and can

correctly interpret your image data will you be able to use a wide gamut monitor to its fullest extent. Unfortunately, many Web browsers and office applications don't support color management, although Safari and Firefox (3.5 and later) are now compatible. Internet Explorer lacks monitor profile translation functionality and, as a result, interprets AdobeRGB images as sRGB, producing dull colors. Conversely, it produces over-bright colors when displaying sRGB images on a wide gamut monitor. In the latter case, you can improve the situation by switching the monitor to sRGB. Most conventional monitors are preset to sRGB, while wide gamut monitors often have additional AdobeRGB and NTSC options. It is always a good idea to use a monitor's own presets if you are planning to calibrate it using one of the predefined color spaces.

colorimeters, including the Spyder3, whereas the Datacolor software only works with the Spyder hardware. Both programs enable you to calibrate multiple monitors on a single system.

basICColor's licensing system prevents the use of its products on multiple computers,

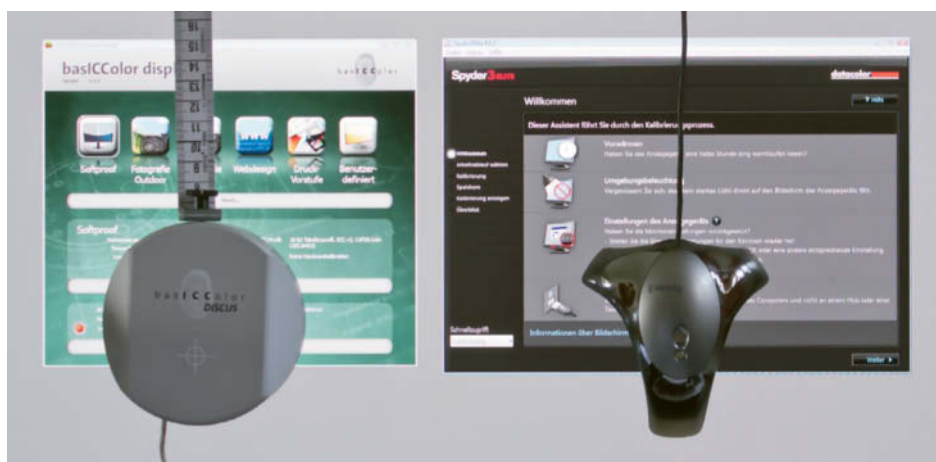
and you have to purchase a separate license for US\$75 for each additional machine. The Datacolor license allows you to install its software on computers at a single location and on up to five notebooks. It also allows you to transport a prepared notebook to your monitor's location and to connect the two for

calibration purposes. Any profiles you create using the software can be distributed but not sold as part of any professional services you may offer.

The Calibration Workflow

Allow LCD monitors to warm up before calibration and familiarize yourself with your monitor's controls and settings before starting the process. The following description applies to the *Spyder3 Elite* software used with the Spyder3 colorimeter on a Fujitsu P27T-6 IPS monitor. Calibration software that is matched with the monitor you are using (which is often the case when the soft- and hardware come from the same manufacturer) can alter some monitor settings automatically, which saves a lot of effort playing with the fiddly monitor buttons.

If your monitor has a 'custom' setting, this is the best one to use – otherwise simply use the brightness and color temperature settings that you like best. The brightness of an LCD monitor is controlled by the brightness of the backlight and alters the black point (i.e., the amount of light that an unlit LCD cell allows to pass through). The color temperature of CCFL backlights and ones that use white LEDs cannot be altered. Only the brightness of RGB



The basICColor Discus (left) and the Datacolor Spyder3 colorimeters shown with their respective software interfaces. Calibration programs require independent installation to work correctly – installing two such programs simultaneously on a single computer produces unpredictable results and can even cause your system to crash.

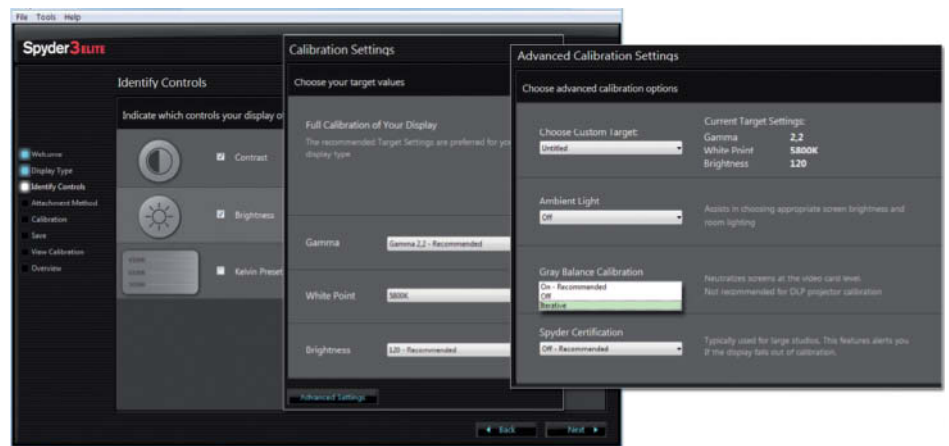
LEDs can be altered without having to alter the brightness of each pixel individually. Leave the contrast setting unaltered at 50% and set the gamma value to 2.2. These are proven reference values that you can always use as a jump-off point for calibration, even if your program uses the L^* gradation curve instead of a conventional gamma value.

While gamma/ L^* corrections serve to keep color transitions balanced, the gray balance setting ensures that gray tones are reproduced without color casts at all brightness levels. The RGB tone curves are adjusted separately, and we recommend that you use the iterative gray balance method if you often work with black-and-white images. This takes longer but produces more reference points and is more precise than the standard gray balance setting.

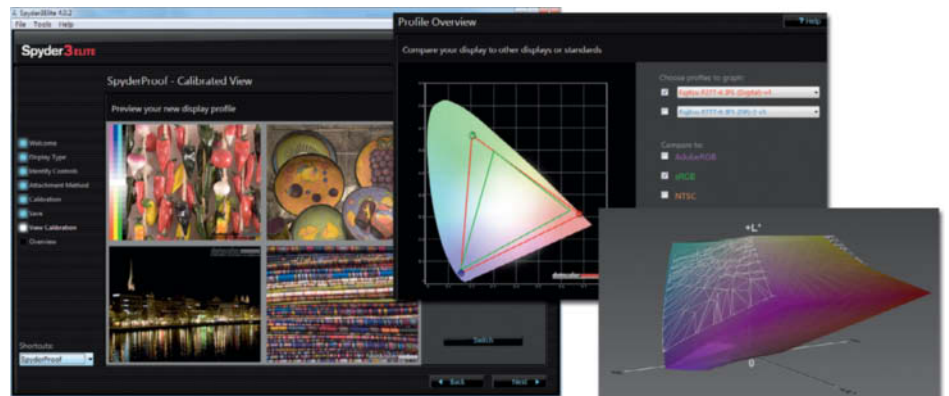
The first steps in the calibration process assess the primary colors and the white and black points. The Spyder software then requests that you enter an approximate brightness value. Any remaining inaccuracies are equalized later by the profile. The rest of the process is automatic and delivers before/after images so that you can compare the results of the process with the look of the uncalibrated monitor. The program also produces two-dimensional color space comparison diagrams, which you can use to compare your results either with three standard profiles or with other monitor profiles that you have created yourself.

From the profile overview, you can navigate to the Advanced Analysis screen, which includes an option for checking screen uniformity. Any discrepancies in the eight quadrants used to compare the rest of the screen with its center are displayed graphically. Unfortunately, this is a purely informational tool and offers no functionality for 'correcting' any deviations it reveals.

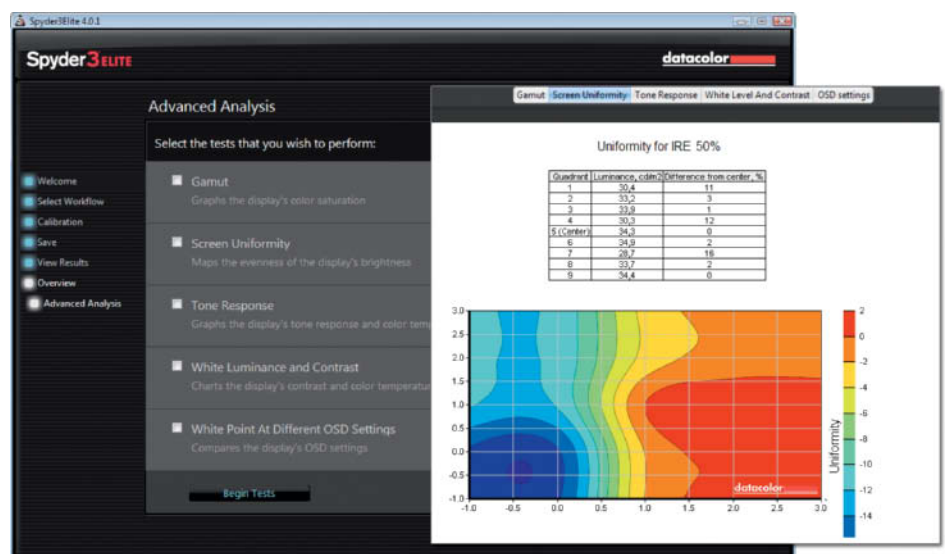
The Datacolor software produces matrix profiles and writes all correction values to the graphics card (i.e., software calibration). The *basICColor Display* software is also capable of hardware calibration. It can be used with the Spyder hardware too and can produce LUT profiles with as many as 700 reference points. These are more precise than the ones produced by Datacolor and our test profiles contained a slightly larger color space. Both programs can produce ICC version 4 profiles. There are presets for various situations, such as outdoor (with a higher overall color temperature for notebook users on the road), indoor, Web design and pre-press. In general, the *basICColor* software was more clearly set out and easier to use. Datacolor includes plenty of options, but they are more difficult to find.



The *Spyder3 Elite* software requires you to identify your monitor's controls and enter target values before starting the calibration process. The software also has an expert mode in which you can define your target values more precisely and create your own tone curves.



The software enables you to check your results using (rather small) sample images or using 2D color space diagrams (shown here compared with the sRGB space). The 3D view on the right (created using ICCView) shows that the monitor's own color space is larger even than the AdobeRGB space in some places.



Spyder3 Elite's advanced options include a built-in tool for analyzing screen uniformity

Operating System Colors

Color management only works properly if it is part of a complete system. Apple was quick to recognize this and introduced its own ColorSync system in 1993. Microsoft's Integrated Color Management (ICM) offers system-wide color management functionality, but it is the application manufacturers who have to ensure that the guidelines are implemented. Many approach the subject rather half-heartedly and some simply don't bother, making it necessary to adjust a number of settings yourself.

Microsoft itself is inconsistent too – even the latest version of Microsoft Office doesn't support color management and the implementation in Internet Explorer is still only half finished.

With the introduction of XP, Windows finally included a well-thought-out profile management system similar to ColorSync, although Microsoft managed to compound the confusion by introducing the Windows Color System (developed together with Canon) with Vista. Theoretically at least, WCS is superior to the traditional Windows ICC-compatible color management system, but it has yet to be adopted by any major hardware manufacturers. As long Windows XP, 7 and 8 support ICC profiles, there is no

need to pay WCS any attention, especially if your hardware supports ICC profiles too.

Most current image processing software is color management-compatible but, for more than 11 years now, *Photoshop* has remained top of the heap with regard to flexibility. The current Adobe CM system was introduced with version 6.5 which, theoretically, still has better color management chops than much of the brand new competition.

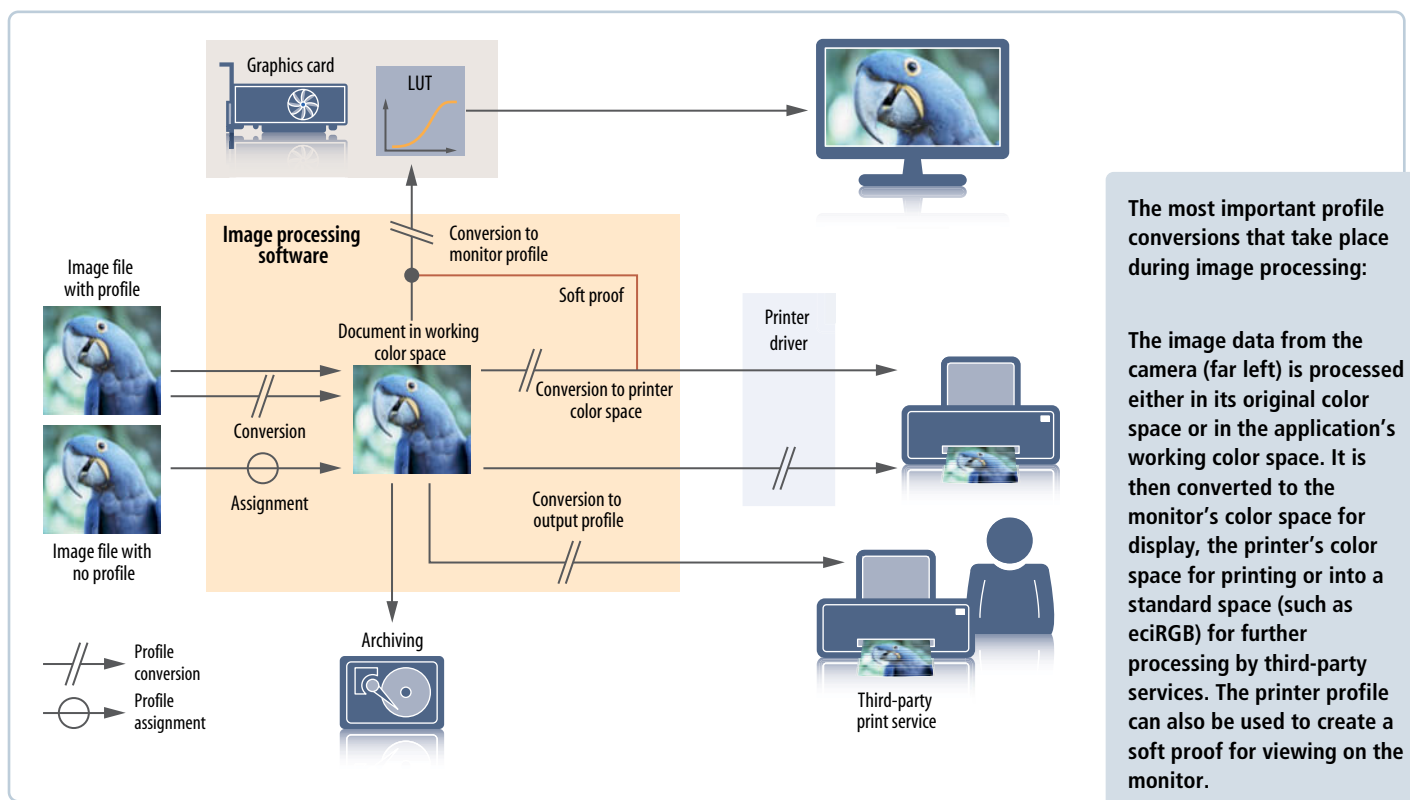
Setting up Color Management in Windows

The most important part of any color management system is the color management module (CMM), which is part of the computer's operating system. This module also allocates appropriate profiles to devices attached to the machine. A fresh Windows 7 installation includes a generic (WCS-based) sRGB monitor profile and a few other standard device profiles. All other profiles are installed later on with applications and device drivers, or automatically during monitor calibration.

All devices (and their profiles) that Windows recognizes are listed in the Color Management tool in the Control Panel. You

can adjust their settings manually, provided that you have checked the *Use my settings for this device* option.

Many image processing programs pay little or no attention to the color management settings you make in the operating system. *Photoshop* automatically uses the Windows monitor profile, but you have to set it manually if you are using *GIMP* or *Photoline*. Other image processing programs rely on the user making the correct operating system settings. For example, *Paint Shop Pro's* color management only works if Windows has at least one monitor profile installed, and printer profiles, too, have to be installed in Windows before they can be selected in the Corel interface. Profiles have to be installed in the standard Windows folder (System32\spool\drivers\color) so that third-party programs can find them. Installing new profiles is a simple matter of right-clicking the appropriate file and selecting the *Install Profile* option at the top of the context menu. Windows then automatically copies the profile to the correct folder and lists it in the Color Management interface. Most image processing programs use the same standard path to look for ICC profiles.



If you install a new printer using the manufacturer's CD, the software often installs a generic printer profile and assigns it to the printer. However, downloaded or home-made profiles have to be assigned manually to the appropriate device. However, most applications and device drivers don't actually pay heed to this information, making it necessary to select the appropriate profile manually in the application interface or device driver control panel. Be careful not to integrate a profile into the workflow twice. If a printer profile is already assigned to a color-management-compatible application, you have to make sure that color management is deactivated in the printer driver itself. In principle, it is possible to perform this process in reverse, but this is less reliable because not all applications are capable of communicating a file's color space to the printer driver.

Assigning a profile to a device in the Windows color management interface can also cause additional confusion. For example, in Corel *Photo-Paint* versions X4 and earlier, such a profile is listed in the Corel color management dialog once as a description of the profile and a

second time under the name of the device. Profile names can also be a problem, and process-internal naming schemes are by no means guaranteed to be the same as a profile's ICC filename. Windows color management lists both names, but many programs (including *Photoshop*) only recognize a profile's internal name. Eizo's *Color Navigator* gives each newly generated profile the same default name ('Photography'), which means that *Photoshop* only ever lists one Eizo-based profile name.

In conclusion: leave Windows' own color management as wide a berth as possible and use your application's built-in color management functionality as much as you can.

The Color Management Workflow

Monitor calibration and correct operating system setup are the basic prerequisites for any color managed workflow. Provided that your display software offers appropriate support, this will guarantee faithful on-screen colors.

Strictly speaking, even these preparatory steps aren't always necessary, as the simplest of all workflows involves passing your image files on to a print service exactly as the camera captures them in either the sRGB or AdobeRGB color space. All print services are capable of interpreting sRGB files, and sRGB is also widely recommended for Web publication purposes.

sRGB extends beyond some printer color spaces in some places and is smaller in others. Where it is larger, bright on-screen colors simply cannot be reproduced in print, while a smaller color space doesn't use the printer's potential color range to its full extent. It can happen that a strong print color really is present in the subject but remains invisible on the monitor because it is not included in the sRGB gamut. A 'faithful' color is a relative concept, and there is nothing to be said against adjusting blue and cyan saturation in an image until it matches our memories or our personal taste. Color management is not designed to keep colors true to nature, but rather to help ensure that we end up printing or publishing the colors we want, whether

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Martina Holmberg

Sixty Tips for Creative iPhone Photography

August 2012, 144 pages
978-1-937538-12-5, 5.5 x 8.3 Softcover
US\$ 24.95, CAN\$ 25.95

Martina Holmberg shares sixty tips that cover everything from shooting and editing photos using your iPhone's basic features, to third-party apps and techniques for turning ordinary snapshots into unique and artistic images. The book is filled with images that illustrate each tip.

Also included are two guest galleries that showcase iPhone photos from professional photographers Dominique James and Uwe Steinmueller. You'll be amazed and inspired by the artistic photography that can be achieved using the iPhone.

Topics include:

- Shooting and editing photos
- Developing your photographic eye
- Composing interesting snapshots of your everyday environment
- Using third-party apps

This is another title in Rocky Nook's *edition espresso* series: books that keep the content short, strong, and to the point—like a great shot of your favorite espresso. The ideas and inspiration found in this little volume are sure to improve your photography.

these deviate from those in the original subject or not.

This process requires the use of a color space that is at least as large as the one used by your chosen output device. sRGB is simply too small for making high-quality prints on high-end photo paper and is much too small for use with inkjet photo printers. AdobeRGB has a larger gamut, but still doesn't include many printable colors. The best currently available color space for print output is *eciRGB_v2*, and print services that claim color management compatibility should be able to work with it. But remember: it is only worth using color spaces that are larger than *eciRGB* if you use a 16-bit image processing workflow.

The illustration below depicts a number of workflows with various different types of input files, output devices and quality levels. These all assume that the original camera files are either sRGB JPGs or RAW. Because it only offers marginal improvements over sRGB, we haven't included AdobeRGB here. In principle, you can substitute AdobeRGB for every instance of sRGB in the illustrated workflows, but you will then have to insert an additional conversion step for every print service that doesn't offer AdobeRGB processing.

If you shoot in RAW and use a high-quality RAW converter, you will be able to squeeze every last drop of quality out of your image files, including the use of your own camera profiles if you wish. Many contemporary RAW converters have a wide range of built-in image

editing tools, making separate image processing software increasingly redundant. *Lightroom* can be used to output RAW image files using all standard RGB profiles and can convert files to any RGB profile you like during export for transfer to a print service.

If you do want to use a separate editing program, first convert you files to the larger, 8-bit-compatible *eciRGB* color space. Unfortunately, *Lightroom* doesn't offer an *eciRGB* option for file import (the External Editing preferences only offer sRGB, AdobeRGB and ProPhoto RGB), so the only alternative is to use the appropriate export function. *Lightroom* uses the ProPhoto color space for its internal processing, thus saving you a conversion step if you use it from the start. The other potential advantage of using the ProPhoto space is that in future, when monitor quality has improved, you might just benefit from your prescient use of a large gamut and 16-bit processing. For now, ProPhoto still exceeds the quality offered by most of today's output devices.

Working with Color Spaces: Two Basic Concepts

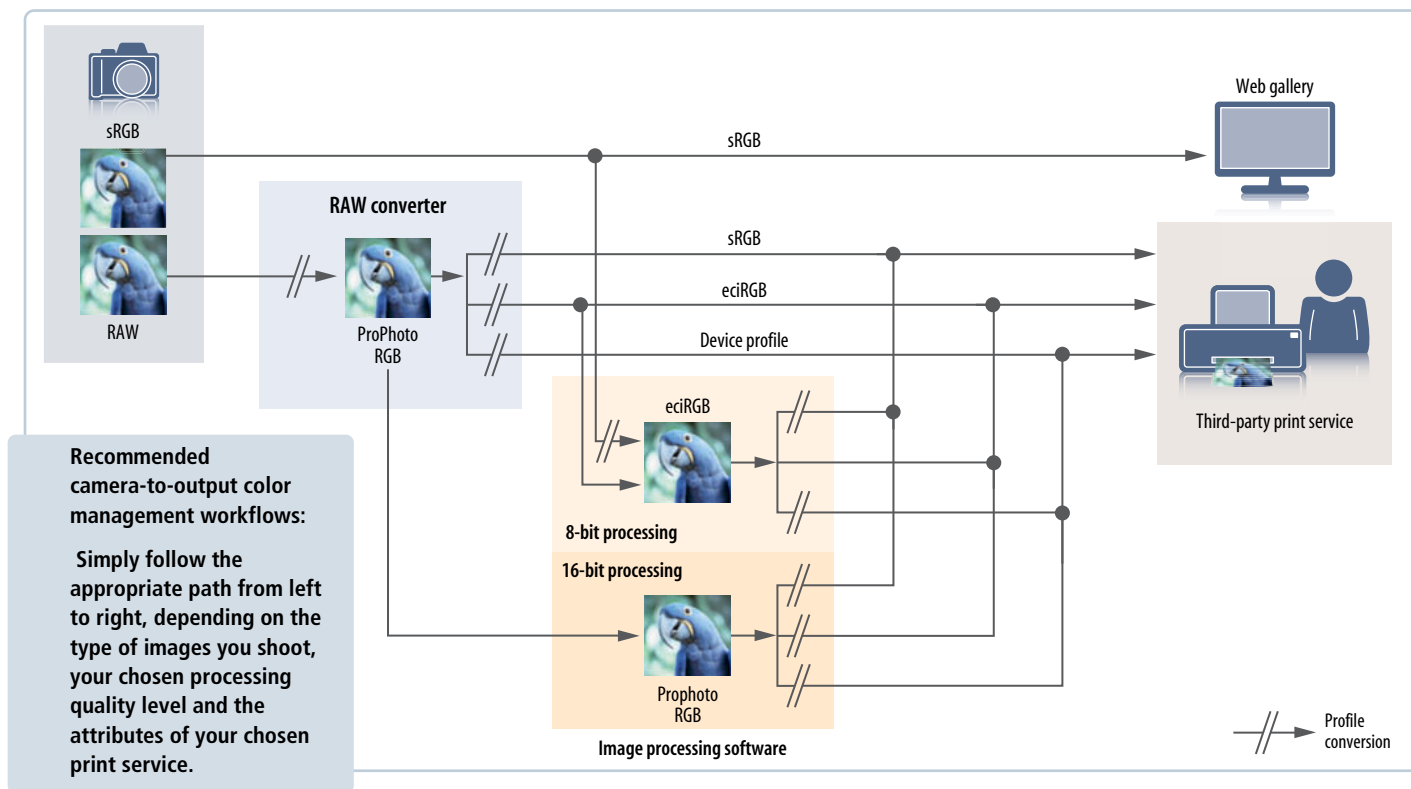
Most pro-grade image processing programs support device profile management and assignment and some (such as *Photoshop* and *Photo-Paint*) even have their own color management module (CMM).

There are two basic approaches to contemporary color management. The more

modern of the two was introduced by Adobe with *Photoshop 6.5* and gives the user a great deal of technical freedom but only alters image files if you explicitly tell it to. The application is in effect the stage on which you use an appropriate monitor profile to present your images in their best possible light.

Using this model, images retain their original profiles (however exotic these may be), but can also take on other profiles – either as an additional layer that doesn't affect the original image data but gives the image a new look, or as an integral part of the file's bits and bytes that changes its structure but not its appearance. The 'working color space' plays a less significant role in programs that work this way, and is only assigned to newly created files or ones whose color space the program cannot detect. Adobe labels images with no recognizable profile 'no tags'. The program's working color space is only assigned to a file for as long as it is open, so an image can look quite different if opened using an alternative program.

The second basic color management concept takes the term 'working color space' literally, and the program performs all image processing tasks exclusively within this space (also known as 'internal RGB'). If you open a file saved using a different color space, it will be automatically converted to your program's working color space – in other words, every image is given the same 'costume' for the duration of its 'appearance' on the program's stage, regardless of whether it actually fits. If it



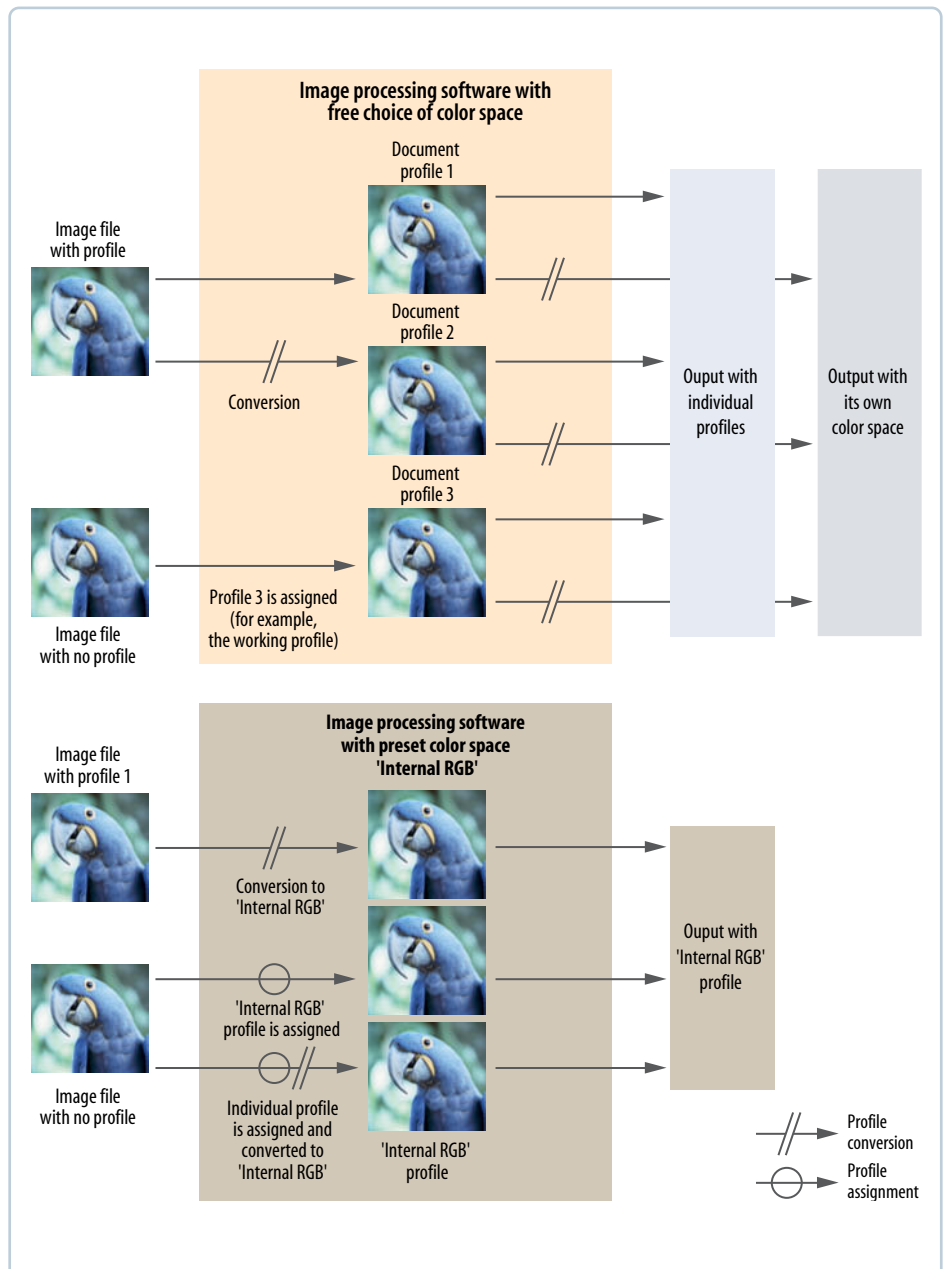
doesn't, the image data is automatically adjusted accordingly. No conversion takes place if the file's profile and the working color space match completely, by name as well as in reality. This is not usually a problem for a workflow in which all images come from a single source and have a single output destination. All you have to do is set the working color space to match the space of the incoming images or your chosen output medium.

Not all programs allow you to select the working color space. For example, before the introduction of the *X* version, *PaintShop Pro* only supported sRGB, and this is still the case with *Picasa* and *FixFoto*. Today's images come from multiple sources and are often destined for use in multiple output formats, making this particular color management concept inflexible and – to be blunt – outdated. Among the more expensive programs we looked at, *PaintShop Photo Pro* was the only one still using it.

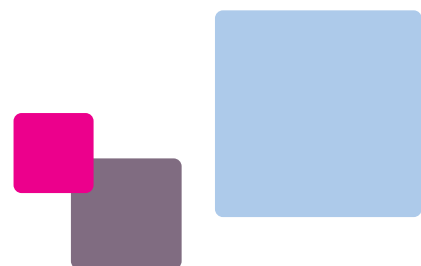
The latest (*X5*) version of Corel's *Photo-Paint* uses a completely revised color management concept that is very similar to the Adobe model. *GIMP* and *PhotoLine* also offer flexible color management functionality, although *GIMP* is not yet 16-bit compatible. *Photoshop Elements* offers a compromise, allowing you to open and process any type of image file, but offering only sRGB and AdobeRGB as working color space and output conversion options. The program supports neither CMYK nor third-party RGB profiles. The sections on the following pages describe the color management settings for the programs mentioned here. *Lightroom* is an exception, as it requires virtually no mandatory settings. The steps necessary for *Lightroom* are described in the 'Workflow' section above.

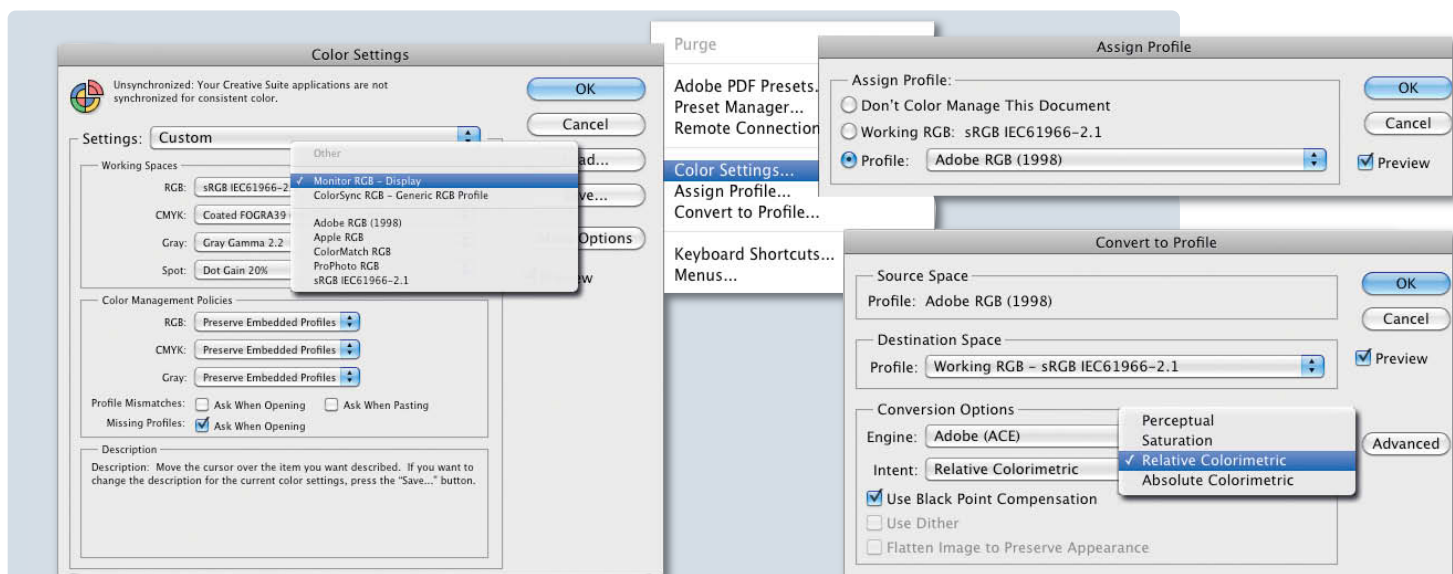
Application Setup

The first step is to check that your freshly installed application is using the correct monitor profile. The second step involves selecting a working color space. We recommend that you use either sRGB or eciRGB depending on the software you use and the structure of your workflow (see page 33). Select a grayscale color profile with a gamma value of 2.2. CMYK profiles aren't relevant to the current process. The settings you choose at this stage determine how your software handles images that have a different profile or no profile at all. The color management dialog (and often the soft proofing settings too) can usually be found in the File or Edit menus. Where applicable, we will also show you what to look out for when assigning and converting color profiles.



Photoshop's libertarian color management system (above) gives the user complete freedom of choice when it comes to profile conversion, assignment and use. Every open file can have a different color profile. The dictatorial concept used by *PaintShop Pro* (below) automatically force converts all files to the program's working color space during loading. The program behaves like an additional workflow 'device' with its own color profile.

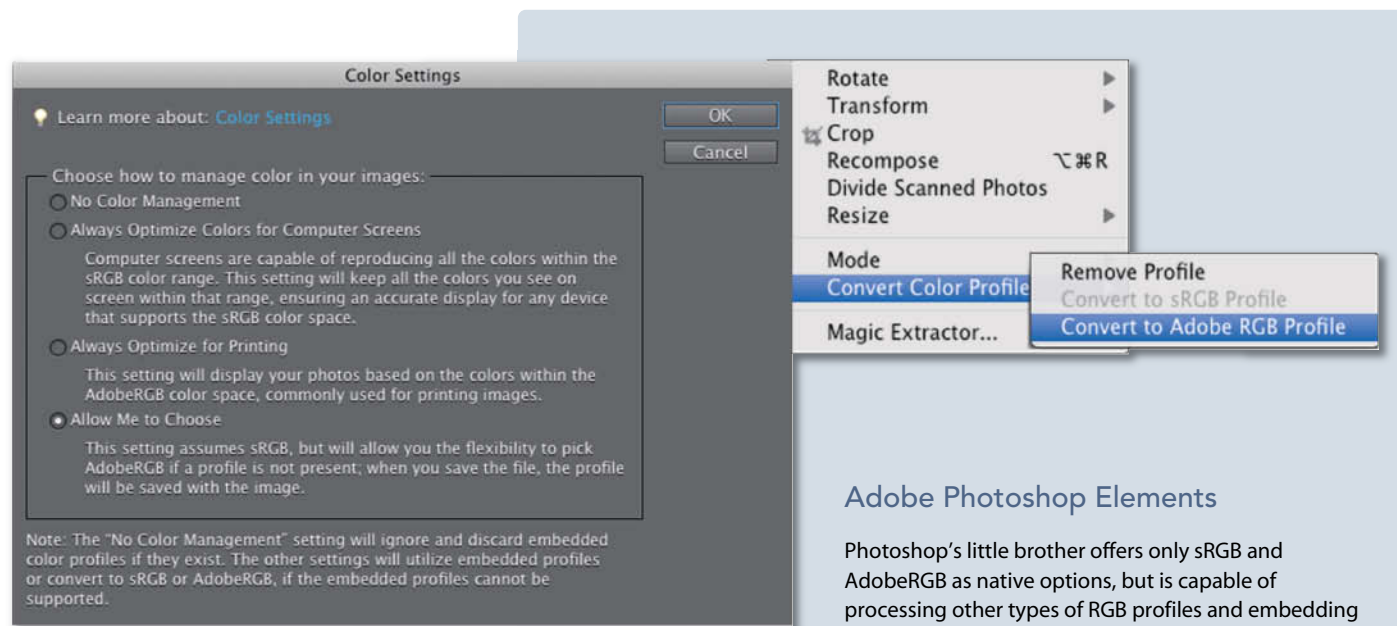




Adobe Photoshop

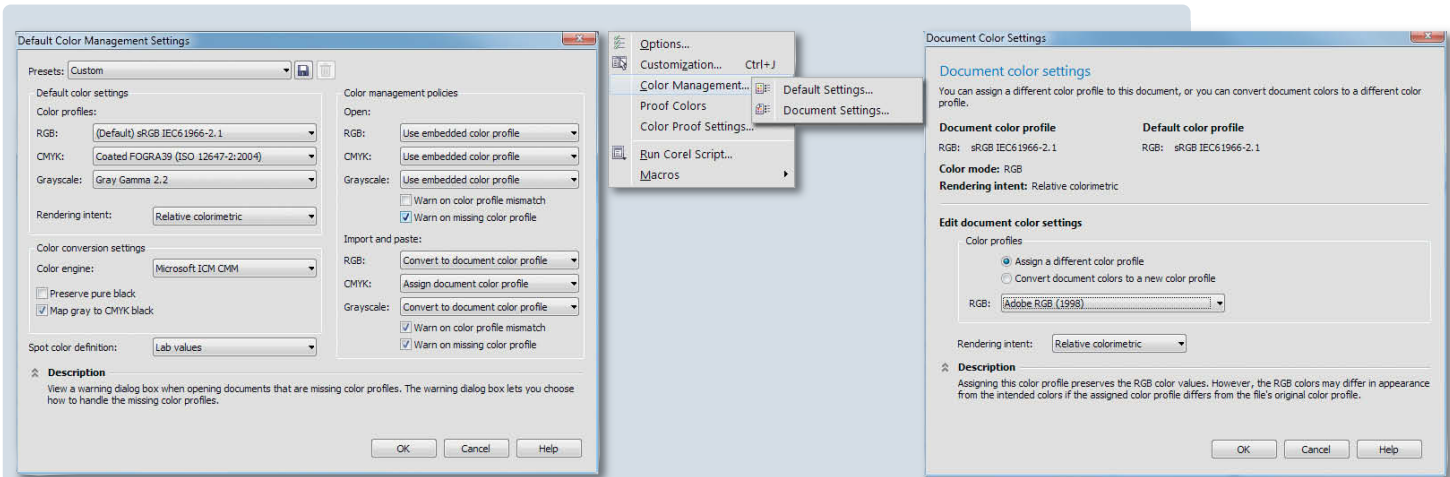
Photoshop's Color Settings have hardly changed since the release of the 6.5 version. The program uses the monitor profile stored in the operating system, which is displayed in the list of RGB color spaces. Photoshop has its own CMM, called the Adobe Color Engine (ACE), which is usually the best option. Always check the *Use Black Point Compensation* option and *Use Dither* for photographic purposes – this reduces the risk of

producing color smears in soft color transitions when you are converting files to smaller color spaces. The four rendering intents are always available but are only relevant if you are using table-based (LUT) profiles for printing or processing by a third-party print service, although even then, you won't always need them. The *Relative Colorimetric* option nearly always produces the best results.



Adobe Photoshop Elements

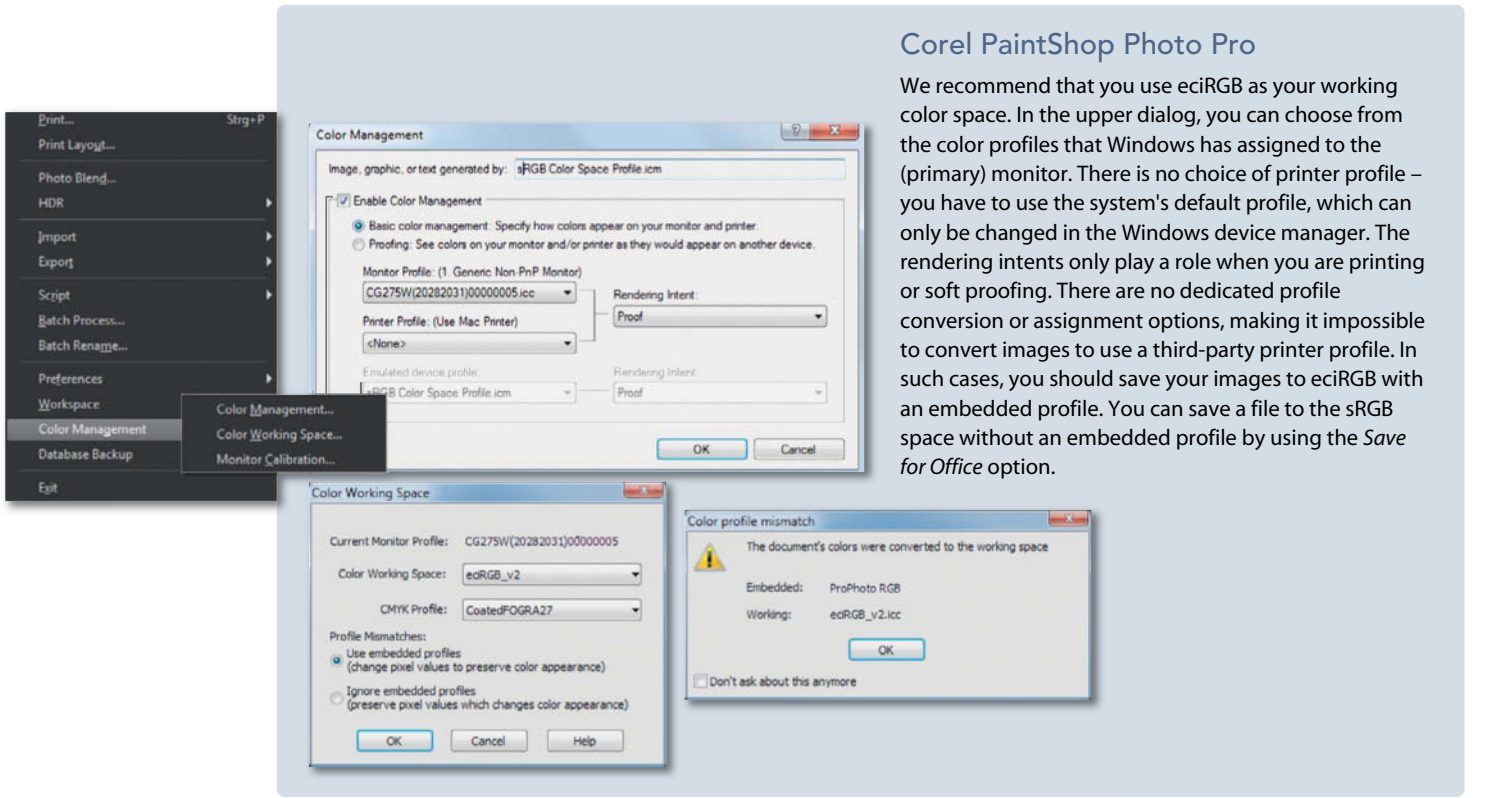
Photoshop's little brother offers only sRGB and AdobeRGB as native options, but is capable of processing other types of RGB profiles and embedding them when saving files. 16-bit images can be opened and processed using a restricted set of tools. sRGB and AdobeRGB are the only target color space options and profiles cannot be manually assigned at all.



Corel Photo-Paint X5

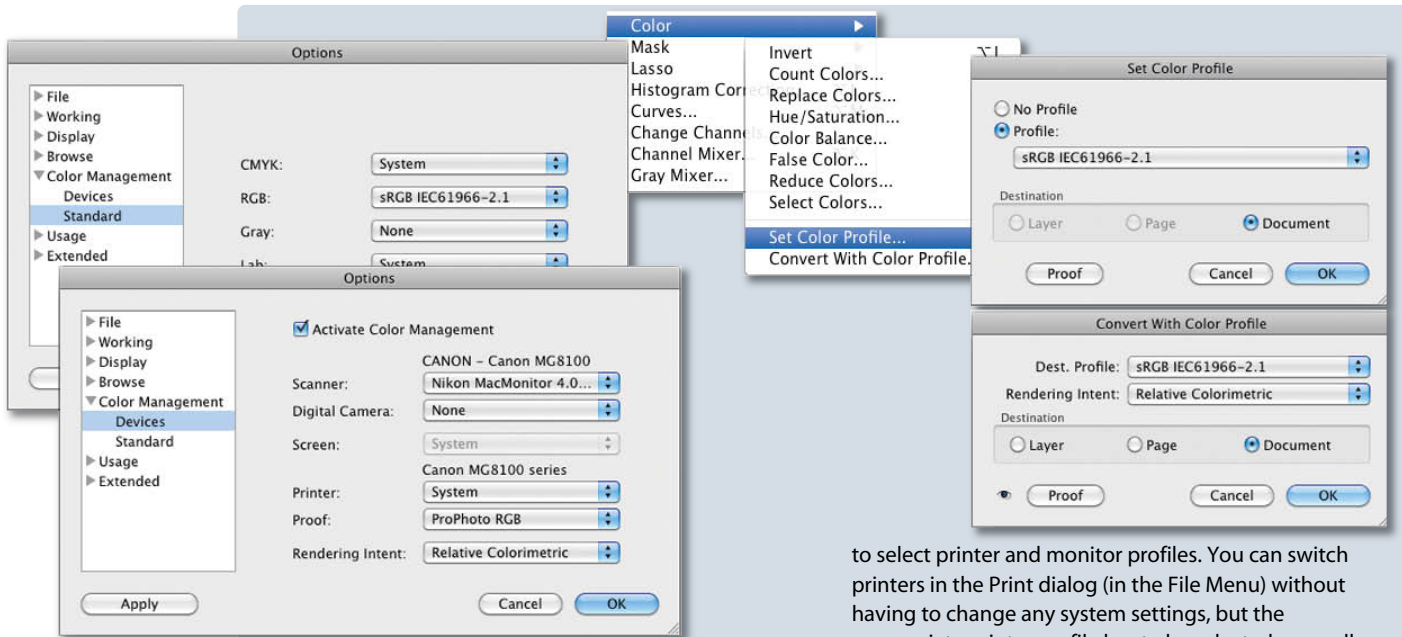
Corel's Color Management dialog has been available in its current form since the release of the X5 version of *Photo-Paint* and differentiates clearly between default (program) and document settings. In contrast to earlier versions of the program, the color profile of an open file can vary from the working color space, which can be selected in the 'Color profiles' section of the dialog. The current monitor profile is also included (without an obvious label) in the list of RGB/monitor profiles that

Windows assigns to the monitor you are using. You can choose from three color engines that don't include the Adobe competition. Corel's color management policies are slightly more detailed than Adobe's, and profile conversion and assignment options are clearly grouped in the Document Color Settings dialog. The *Preserve pure black* option is part of the Default Color Management Settings dialog.



Corel PaintShop Photo Pro

We recommend that you use eciRGB as your working color space. In the upper dialog, you can choose from the color profiles that Windows has assigned to the (primary) monitor. There is no choice of printer profile – you have to use the system's default profile, which can only be changed in the Windows device manager. The rendering intents only play a role when you are printing or soft proofing. There are no dedicated profile conversion or assignment options, making it impossible to convert images to use a third-party printer profile. In such cases, you should save your images to eciRGB with an embedded profile. You can save a file to the sRGB space without an embedded profile by using the *Save for Office* option.

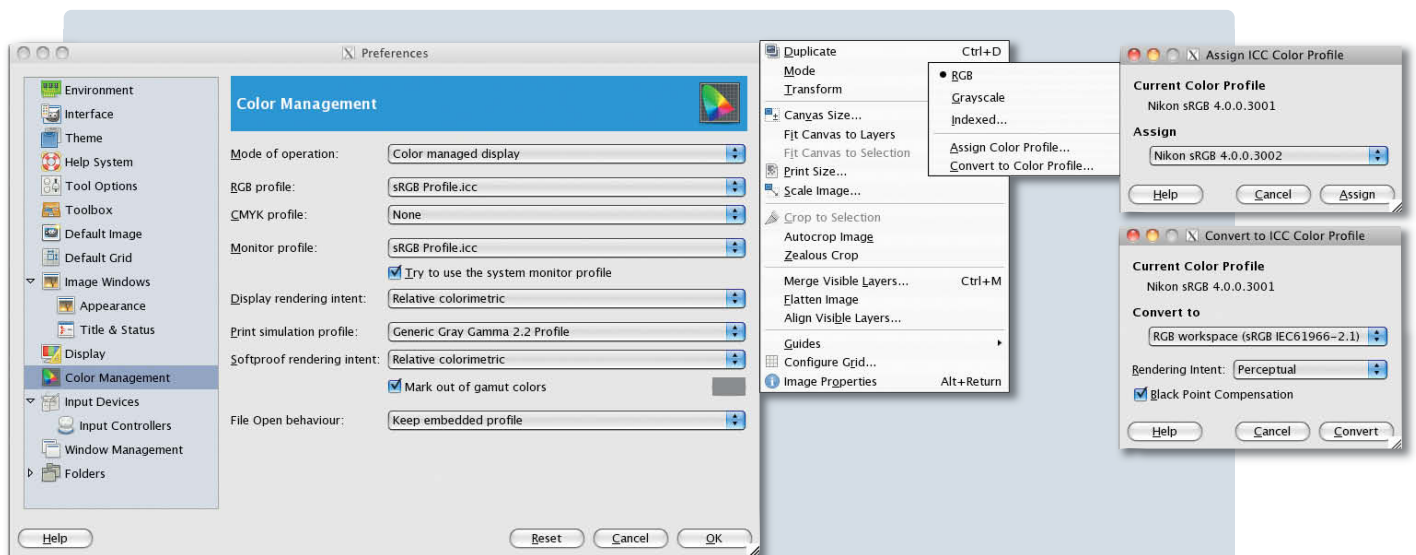


PhotoLine

PhotoLine's Color Management settings are split into Standard and Devices categories. The profiles selected in the Standard dialog are only relevant for new files or ones without tags. If you select the *System* option, the program uses the settings made in the Windows color management dialog. The Devices settings can be used

to select printer and monitor profiles. You can switch printers in the Print dialog (in the File Menu) without having to change any system settings, but the appropriate printer profile has to be selected manually in the Color Management dialog. The soft proof profile can also be selected in the Devices section.

Uniquely, *PhotoLine* allows you to assign different profiles to individual image layers – a feature that can be useful when comparing layers, but has no other obvious use, as no other program is capable of reading such a file and all layers are saved to the document's own profile and embedded when you save a file in PSD format.



GIMP

GIMP uses the operating system's monitor profile but allows you to make other settings too, which can be important if you are using it in a Linux environment. The only global policy you can select is File Open Behavior, and selecting the *Keep Embedded Profile* option causes the program to behave like most of the others

mentioned here. *GIMP* automatically reduces 16-bit colors to 8-bit when it opens a file, so a smaller, 8-bit-compatible color space such as eciRGB is the best option when you are exporting images from a RAW converter. The tools for converting and assigning color profiles are located in the Image > Mode menu.

version 4 of the software (see page 118). There is a commercial plug-in available for earlier versions (for GB£10) at www.lightroom-plug-ins.com/ProofIndex.php, which you can use to create up to four profile presets, each with its own rendering intent. However, images can't be edited in the soft proofing view, so exporting your images as 16-bit TIFFs in the largest possible color space (i.e., ProPhoto RGB) and then processing them in *Photoshop* (or any other 16-bit-compatible program) is a more useful option.

You need to set up the soft proof view before you begin soft proofing. In *Photoshop*, navigate to View > Proof Setup > Custom. You can then toggle between the normal and proof views using the Ctrl+Y keystroke, while Ctrl+Shift+Y switches the out-of-gamut warning on and off. The proof and warning views can be combined. You can save your custom proofing profile as a preset that subsequently appears in the Proof Setup menu. This is a highly user-friendly approach, as most other programs require you to make your settings in the

program's preferences before you start work.

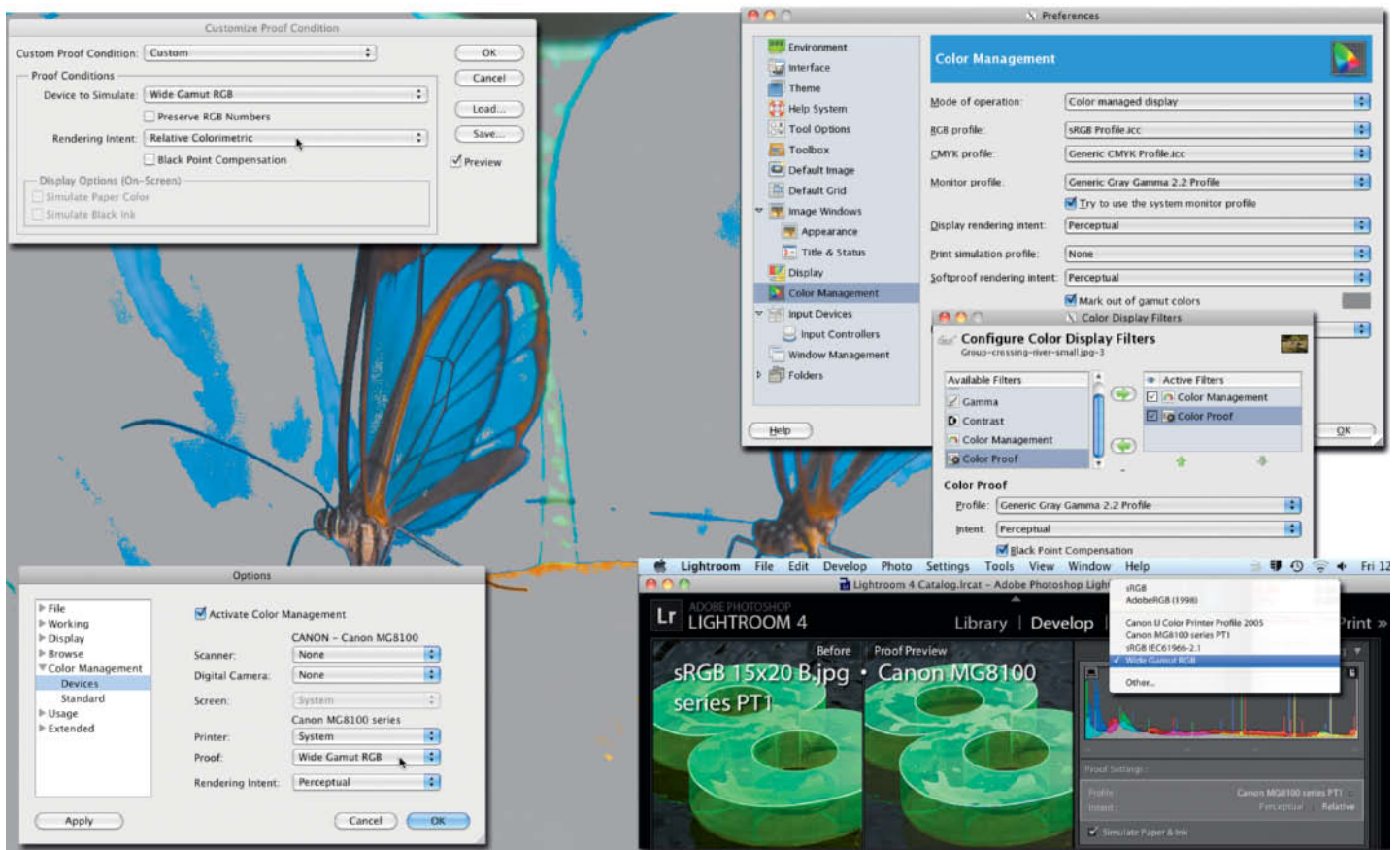
In *Lightroom 4*, the S key switches to the proof preview. You can select a profile and a rendering intent in the Proof Settings panel, where there is also a check box that switches on a *Simulate Paper & Ink* option. *Lightroom 4* doesn't support CMYK profiles and the proof preview can only be viewed in the main program window – a serious drawback for users with dual monitors. There are image and monitor gamut warnings and any adjustments you make are non-destructive, as they are applied to virtual copies of your images.

Improving Your Results

The proof preview highlights where problems might occur during printing. Highly saturated colors – especially green and red – are often difficult to print correctly, even if they can be properly displayed on a monitor. Conversion to a smaller color space results in a loss of detail and can cause color shifts.

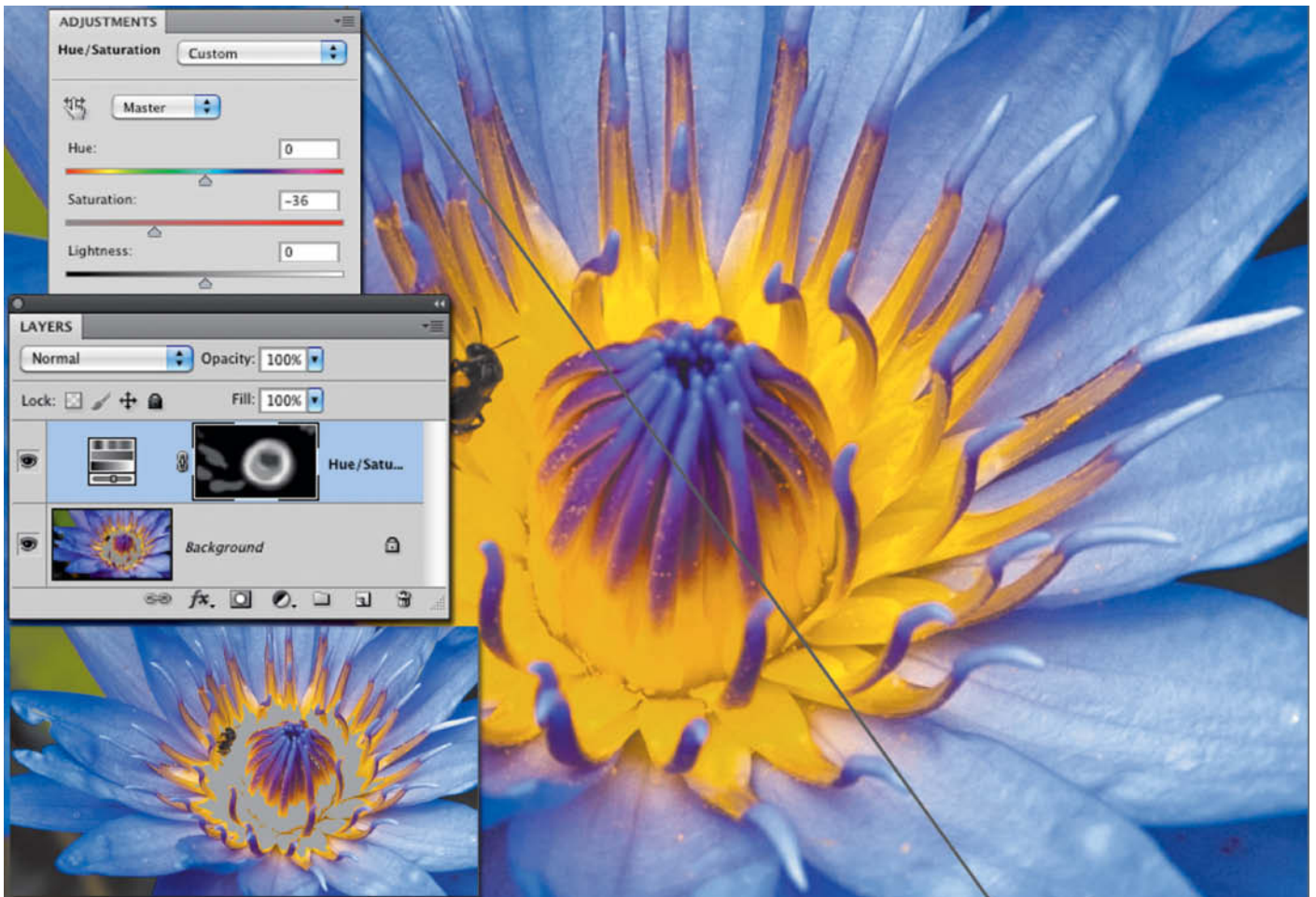
Make a copy of your original image (Image > Duplicate) and Tile your windows to position the two copies next to each other. Now switch on the Proof Colors view and the Gamut Warning. The original image remains untouched and serves as a comparison. Create a new Hue/Saturation Adjustment layer in your image copy, select the color range where the gamut warning shows and reduce saturation in these areas until the color warning disappears. If necessary, you can repeat these steps for other color areas. If the resulting image looks too dull in the Proof Colors view, increase contrast using a Curves adjustment layer, but note that this will have the side effect of once again increasing saturation. You can reduce this effect by using Luminosity blending mode on the Curves layer. To correct color shifts, select the affected color and adjust the Hue slider in the Hue/Saturation adjustments panel.

The disadvantage of this method is that, as well as adjusting out-of-gamut colors, it also influences all the other colors in an image, including the less saturated ones that would



Soft proofing settings for various programs:

Photoshop (top left) and *Lightroom 4* (bottom right) allow you to simulate paper white and ink black (which is never quite pure black). In *Photoline* (bottom left), the proofing profile setting is located in the Color Management > Devices section of the program's main Options dialog. GIMP's settings (top right) are located in the Color Management section of the Preferences dialog or under View > Display Filters. Activating both instances applies the profile twice.



Correcting out-of-gamut colors using a Hue/Saturation adjustment layer and a layer mask. Reducing saturation for the yellow tones (as shown in the right-hand half of the frame) preserves details that would be lost during conversion using a conventional profile (shown on the left).

have fitted into the new color space anyway. In other words, we have the same problem that occurs when we convert to a new color space using a 'perceptive' rendering intent. There is no perfect solution to this dilemma, so we always have to find a compromise and judge the results by eye. It would be much better if we were able to adjust only the colors that lie outside the target gamut. The *Photoshop* Select > Color Range dialog offers the *Out of Gamut* option when selecting a range, but this unfortunately applies to the CMYK working color space selected in the Convert to Profile dialog and not that of the proofing profile. RGB profiles of the type we require for printing on photo paper cannot be selected here at all.

The only alternative left is to adjust colors manually. This is more complex and time-consuming, but it is the most flexible method of all. The following sections describe the method using *Photoshop*, but the individual steps can just as well be applied to other programs that have gamut warning functionality:

- Switch the Gamut Warning on (Ctrl+Shift+Y).
- Create a new Hue/Saturation adjustment layer on top of the image layer.
- Reduce saturation until the gamut warning color completely disappears. It is better to repeat this step for each affected color rather than to apply it globally.
- Select the new layer mask (which is produced automatically when a new adjustment layer is created). Invert the mask or fill it with black to block the effect of the adjustment layer and allow the gamut warning color to show.
- Use a white brush with an appropriately sized soft tip and about 30% opacity to paint over the image areas that are covered by the warning color. Because the layer mask is active, you are actually painting into the mask, making it partially transparent in the areas where you have reduced saturation. Apply the brush repeatedly until the warning color has completely disappeared.

A mask that is used exclusively to work on out-of-gamut colors has an effect similar to using a 'relative colorimetric' rendering intent to convert color spaces, and runs the risk of blurring the differences between otherwise finely differentiated tones. The advantage of using a mask instead of a particular rendering intent is that it can be adjusted to precisely fit the needs of a specific image. The aim of the exercise is to preserve as much color detail as possible when converting an image from a larger to a smaller color space. The luminosity of monitor colors can never be reproduced in print anyway, so the process always involves compromise.

If you are testing a new print service or output process for the first time, it is a good idea to save the image with its adjustment layers and masks in its original color space before making any changes. You can then compare the original with a test print of your converted image to see where you might need to make further corrections. The image file that you wish to have printed should be



The limitations of the sRGB color space are particularly evident in the blue tones (in the center). Using the device profile (on the left) or eciRGB (on the right) produces a much larger color range.



saved as a JPEG file with the new (i.e., converted) color space embedded. You can choose whether to use the ICC profile you used for soft proofing, a standard profile such as eciRGB or your vendor's ICC profile.

Theoretically, an output device's own profile should produce the best results, although we found that the eciRGB versions of our test images often looked better in print. This could be because the vendor's soft proofing profiles match a series of machines rather than a specific one. Fuji, for example, provides generic profiles for various types of minilab and photo paper.

It is important to note that soft proofing is not reliable if a printer or lab machine has a larger color space than your monitor. In this case, the gamut warning won't register any discrepancies, but the colors on the monitor might end up looking muddy, and it is all too easy to overcorrect them as a result – even if the printer in question is capable of reproducing all the tonal differences present in the image. *Photoshop's* Monitor RGB setting (in the View > Proof Setup menu) reduces the saturation of the colors displayed on the monitor, which gives an image a slightly dull look, but makes tonal differences in highly saturated areas visible. You can achieve the same effect in other programs by globally reducing saturation.

Hard Proofs

We had our smaller test images printed on minilabs such as the Fujifilm Frontier or Agfa D-Lab and our larger formats on Durst Lambda and Theta or Océ Lightjet machines. Our enlargements were made on Fujifilm and Kodak photo paper using RGB laser and LED machines. These have an internal working

color space that is larger than sRGB but are nevertheless described as sRGB devices. This makes sense when they are used as part of a mass market sRGB workflow, but the process usually includes automatic image 'optimization' that has to be switched off in order to conform to a properly color-managed workflow. The machines themselves cannot interpret individual profiles, but usually have an sRGB mode that can be switched on and off. The Fujifilm Frontier calls this PD/no-convert mode and requires image data to be delivered in the machine's own color space, ideally using a profile that is custom built to suit the specific machine and paper type being used. Conversion has to be performed either by the customer or the service provider before printing, so achieving colors that are better than standard sRGB involves a lot of hard work and probably produces a lot of reject prints too. The end result is that there are very few print service providers who are prepared to take the trouble to use non-standard color spaces.

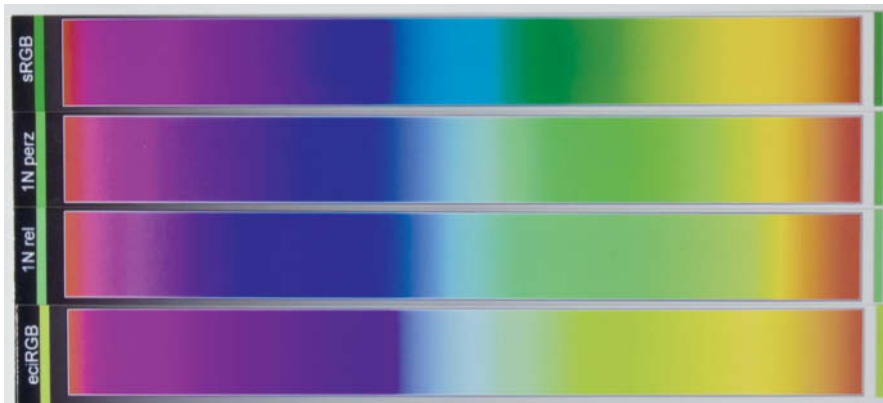
Making Test Prints

A simple test print of a rainbow gradient will show whether your chosen vendor can handle embedded color profiles. Save your gradient in sRGB and convert the resulting image to all the color spaces you wish to test. Send these images (with embedded profiles) to your chosen vendor(s) for printing. The colors in an sRGB rainbow gradient all fit into other standard color spaces (such as AdobeRGB or eciRGB) as well as the printer's device color space, so they should all look identical in print. This test also shows whether the vendor applies any 'optimization' to color contrast in order to produce crisper looking results. This

type of process produces obvious steps in otherwise soft color transitions.

Our across-the-board test produced only average results. A couple of the vendors we tested provided adequate color management, while one failed to detect the embedded profile and converted the image a second time, producing obviously brightened shadows. One provider only sent us a soft proofing profile on request, but asked us to convert our images to eciRGB for printing. This appeared to be the kind of approach we were looking for until we discovered that the eciRGB print looked exactly the same as the sRGB print produced by the same vendor.

Only one of the vendors we tested explicitly recommended that we convert our images to their device profile for printing, although in this case, the result was of lower sRGB print made using the same machine. None of our test vendors provided clear online information regarding the profiles they sent us. We assume that they are only intended for soft proofing use and are generic profiles that don't relate to specific output devices. Vendors who do use machine-specific profiles are generally reluctant to distribute them. This represents a degree of logistical precision that is difficult to provide in the real world and, even if a vendor is able to provide a profile that applies to just one machine and one type of paper, it is difficult to guarantee that exactly that machine will be used for a specific print job. The same problem applies if you send an image of a target to a vendor for remote profile creation, and many vendors simply aren't prepared to make the effort. And if you want to share and output files using device-independent profiles, you can always use a standardized color space anyway.



larger color spaces are particularly obvious in high-end fine art inkjet prints. Machines with even finer print heads are likely to be introduced to the commercial printing environment in the near future.

Conclusion

There is a lot of tinkering and compromise involved in setting up a usable color management system, but it is definitely worth the effort!

Always start by calibrating your monitor. Setting up your image processing software and operating system is not as tricky as it might seem at first and enables you to edit, output and share your images without any loss of color or tonal quality. It is then also much easier to find out whether your printer, the print service or the images themselves are at fault should you end up with sub-optimal results.

Never trust a vendor's claims regarding color management without making test prints first. There are no hard-and-fast rules for 'getting it right' and even using sRGB for all your images doesn't guarantee success. Many vendors use sRGB profiles to cater for a mass market that often prefers bubble-gum colors to faithful tonal reproduction. Test prints using supposedly identical paper and print processes are especially valuable if you are planning to make expensive large-format DiBond or acrylic prints. You will usually be able to tease a quite a lot of extra color out of your images if you use a large color space such as eciRGB.

Our acid test was to see whether the image of the ColorChecker target we used to calibrate our camera earlier on was reproduced accurately in print. Faithful colors in a print like this indicate a reliable end-to-end color management system.

Camera calibration is often only important for one or two 'critical' colors, as demonstrated by the illustration on the left. These discrepancies are not usually obvious in everyday photos, and the Adobe standard calibration profile in *Lightroom* produces very good colors in daylight and fluorescent light. The profile we produced using the ColorChecker Passport (for LED light) and the dual illuminant profile we made using the *DNG Profile Editor* (for shaded daylight and LED light) ended up being the best of the bunch. (keh) **ct**

When rainbow gradients end up looking as varied as this, you can be sure that the print vendor concerned doesn't allow for embedded color profiles

Curiously, we also had one case in which a vendor's proofing profile produced better results than any of the standard profiles, even though the vendor explicitly requested that we don't use the supplied profile for output. We also achieved better results using device profiles with slightly increased saturation than we did using eciRGB profiles.

Test prints are essential if you want to use a device profile for output. The use of different rendering intents produced varying results at some of our test vendors and made no difference at all at others. Although all of the services we tested had their idiosyncrasies, it is generally safe to say that using a relative colorimetric rendering intent produces stronger colors but tends to reduce

the degree of differentiation between tones in highly saturated image areas that contain out-of-gamut colors. We achieved our best results using the manual correction methods described above and a relative colorimetric rendering intent.

Among the vendors who were able to handle different profiles, the differences between sRGB and eciRGB prints were much more obvious than those produced by using paper from different manufacturers. sRGB generally produced paler colors that didn't do justice to the color reproduction capabilities of the paper, especially for blue tones. Inkjet technology has recently overtaken traditional photo print techniques as far as image quality is concerned, and the advantages of using



The ColorChecker Mini (in the center) and four prints made from shots of the target taken in LED light and developed using the indicated profiles



Maïke Jarsetz

Precision Selections

The Supreme Image Editing Challenge



Image: quavondo (iStockphoto)

There are many selection tools around, but they quickly reach their limits when faced with complex or advanced tasks. You can only really master truly complex selections if you thoroughly understand the interrelationships between selections, masks and channels and are well versed in advanced masking techniques.

This article presents all the grass-roots knowledge, tools and techniques you need to make perfect selections as part of your daily workflow and gives you the edge when it comes to tackling tougher jobs too.

We use six in-depth examples to help you get to grips with the concepts and techniques involved, and sample images are included on this issue's free DVD for you to practice on.

In addition to the tools built into *Photoshop*, there are a number of dedicated selection plug-ins on the market that compete for creative users' attention. We will be testing some of these in future issues of *c't Digital Photography* and we will let you know whether you are better off relying on your own manual selection skills or the latest advanced algorithms.

Perfect selections are one of the great challenges for any Photoshop user, and everyone has their own particular way of approaching them. The most difficult selections involve hair, fur and other complex subjects. This workshop gives you a comprehensive overview of the techniques you can use to extract flawless selections from many different types of images.

The Basic Principles of Object Selection

You will need good basic knowledge of *Photoshop* selection and masking techniques before you start to make any selection. That might sound complicated, but in fact, the differences between a mask and a selection are minimal. Both serve to display and save selections and differ only in the ways they can be edited and fine-tuned.

Masks are the more versatile alternative and allow you, among other things, to feather the edges of a selection – in other words, you can edit its individual pixels. Nevertheless, or rather *because* this is the case, it is often a good idea to make an initial selection and some basic adjustments using the program's automatic tools. They are easy to use and are quite smart at doing what they were designed to do.

Once you have made a rough selection, you have to fine-tune its edges. The best tools for doing this can be found in the Refine Edge dialog that was introduced with *Photoshop* CS3 and has been getting bigger and better ever since, but you will still have to correct any serious flaws in your mask by hand. To do this, experienced users switch to Quick Mask mode, which temporarily transforms a selection into a mask and enables you to edit it using pixel-level tools such as brushes.

Younger *Photoshop* users have grown up using layer masks, which can be used to permanently save a mask or selection. This approach enables you to edit a selection at any time while leaving your original pixels untouched. *Photoshop* CS4 saw the introduction of the Masks panel, which makes

working with masks even more user-friendly. The Masks panel includes direct access to the Refine Edge options and other popular selection tools, such as Color Range as well as a number of non-destructive edge editing sliders of its own.

While we are on the subject, the term 'non-destructive' leads us straight to one of the cardinal rules of making selections, namely: Don't delete anything! Not a single pixel! You never know what it might be good for. But seriously, the Del key and the eraser should be taboo – unless you use them on the mask itself. And even in a mask, it's better to use a brush to make adjustments. It is all too easy to delete valuable pixels at the edges of a selection that won't actually cause any problems in front of a new background or can be integrated into a new image using other techniques.

At the end of the day, we always work with pixels. You might think that you are selecting parts of a subject, but what you are really doing is sorting pixels arranged in an orderly pattern into the categories 'good' and 'bad'. If you are selecting hair, for example, you will always find pixels that include both hair and background, and you will have to decide which are actually useful and which will spoil

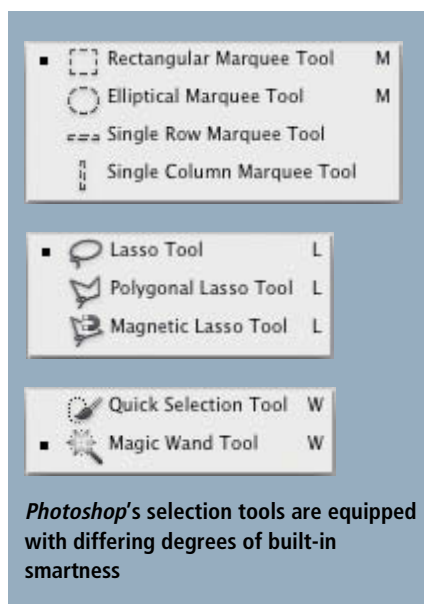
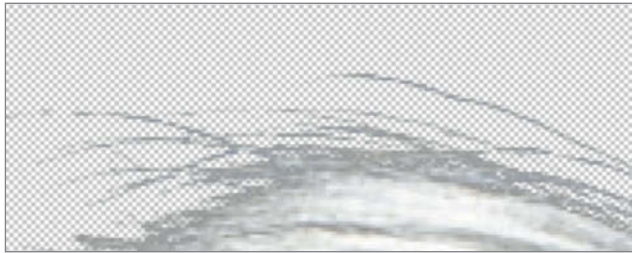


Image: Andrej Burak (iStockphoto)

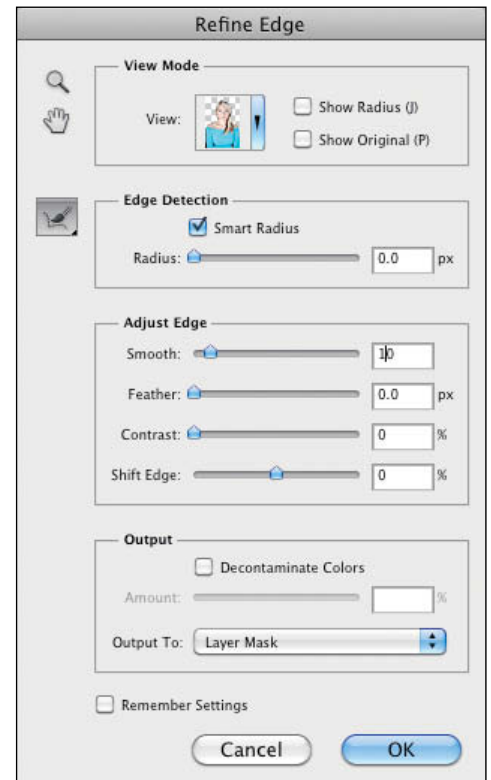
A layer mask like the one shown in the center saves a selection permanently. Advanced masking techniques and channels can then be used to make its details visible and editable.



Digitally captured hair always shares its pixels with the background (top). Inevitably, some 'hair' pixels will have to go when you are making a selection.



The options included in the Refine Edge dialog allow you to combine the best tools for fine-tuning the edge of a selection



A selection saved as a channel is not immediately visible in the image preview, but can be loaded at will or extracted using video or layout software. The quickest way to transform a channel back into a selection is to press the Ctrl/cmd key and click on the channel's thumbnail.

If you click the 'Mask Edge' button in the Masks panel, the Refine Mask dialog appears. This contains all the same options as the Refine Edge dialog and enables you to apply all the same fine-tuning options to your layer mask.

the effect you are aiming for. Some pixels will always fall victim to your image editor's knife.

Perfectionists like to create their own custom brushes for teasing as much detail as possible out of hair selections. Remember, there is no such thing as a perfect selection, but it's always worth trying to get as close to perfection as you can.

Selections, Masks and Channels

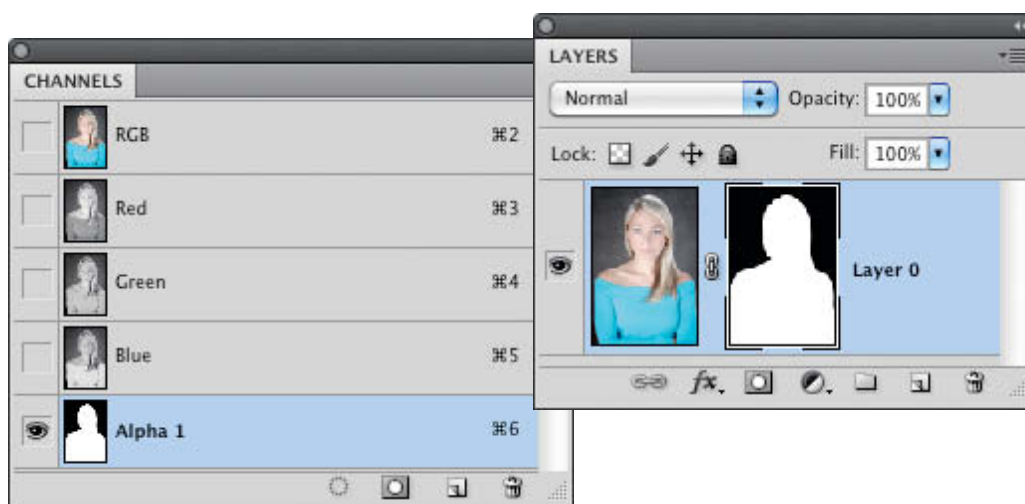
The distinctions between selections, masks, channels and layer masks are often blurred. Channels and masks are pixel-based and are well suited to analyzing and fine-tuning a selection's edges and soft transitions. The difference between selected and non-selected image areas is clearly visible in a mask.

A mask consists of black pixels that are displayed red and semi-transparent on the monitor. The mask is displayed if you switch

to Quick Mask mode by pressing the **Q** key and by default in the Refine Edge dialog, where you can also switch to solid black or white mask views.

You can use the options in the Refine Edge dialog to adjust the whole of a selection's edge at once. These include smoothing, feathering, contrast adjustment and Shift Edge, which increases or decreases the size of the selection radius. Quick Mask mode is particularly suitable for refining small details using the built-in Refine Radius tool.

The Select > Save Selection command either saves a selection as a channel or applies it to the current layer in the form of a layer mask. The selected areas are unmasked and are represented by white pixels, while masked areas are displayed in black. Soft or semi-transparent transitions are displayed using gray pixels. Channels and masks can be edited and altered at any time using pixel-based tools.



A layer mask (on the right) is the most flexible tool to use for saving and editing selections. A selection saved in the Channels panel (on the left) is always available, even though it is not visible in the image during editing.

Basic Selection and Masking Tools

In addition to the standard Rectangular, Elliptical and Row/Column Marquee tools, the Lasso and Polygonal Lasso tools are part of *Photoshop's* basic selection toolset. The Magnetic Lasso tool is where things start to get really smart – it automatically draws outlines that snap to the edges of defined areas within your image. Its width is freely configurable and you can select its sensitivity to edges and the frequency with which it sets fastening points.

Although it is one of the most widely used *Photoshop* selection tool, the Magic Wand is really only suited to making relatively simple selections, such as single-color shapes. Its Tolerance value is adjustable but the tool is still not particularly flexible. However, if you deselect the *Contiguous* option, the tool looks for similar pixels throughout the entire image. The self-explanatory *Sample All Layers* option is also very useful.

The Quick Selection tool has been part of the *Photoshop* toolset since the release of CS3 and is a lot smarter than the Magic Wand, as it combines the features of the Magic Wand with a Color Range selection. The tool's

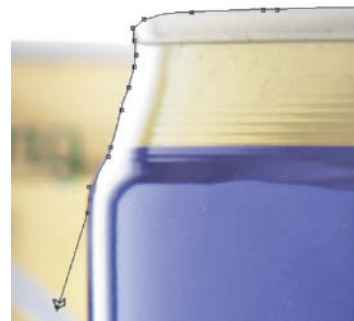
tolerance is controlled by the size of the brush tip you use and all the pixels within the tip that have appropriate tonal values are selected. You can often make genuinely effective object selections just by moving the tool vaguely around the appropriate part of your image and clicking.

The following general rules apply to all of *Photoshop's* selection tools: you can add to a selection by holding down the Shift key while extending the outline; you can remove part of a selection by holding down the Alt key while tracing the outline of the part you wish to discard; and the intersection of two selections can be selected by pressing Shift and Alt while clicking between them.

The results you can achieve using the tools mentioned so far are seldom perfect and usually require tweaking in a mask to get them just right. You can do this either in Quick Mask mode or by transforming your selection into a layer mask – the basic principles and the tools you can then use are the same. In Quick Mask mode, the non-selected (i.e., masked) areas are displayed in semi-transparent red by default, and any adjustments you make are

Quick Tip

The Magnetic Lasso tool can be tricky to use and is particularly difficult to use effectively when selecting straight edges. A great workaround involves pressing the Alt key to switch temporarily to the Polygon Lasso and using it to draw the straight section of your outline. The next click you make switches back to the Magnetic Lasso.



The tolerance of the Quick Selection tool is controlled by adjusting its size (in pixels)

How to Define a Custom Brush

Step 1

Advanced brushwork in Quick Mask mode isn't limited to using soft brush tips and varying opacity. Reached either by clicking the icon next to the brush size indicator in the control panel or by using the Window > Brush command, the Brush dialog options enable you to define all manner of natural and random-looking brush tips. There is also a large number of preset tips with names like Spatter, Star or Chalk, which you can combine with adjustable parameters such as Spacing, Scatter, Noise and Dual Brush to produce endless brush variations.

Step 2

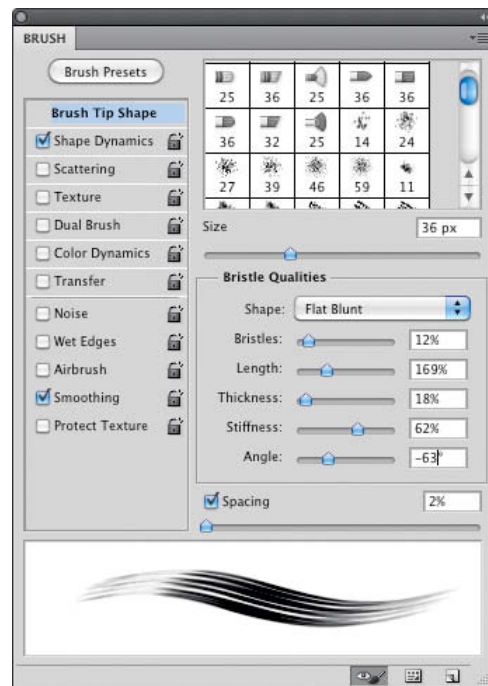
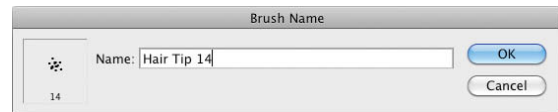
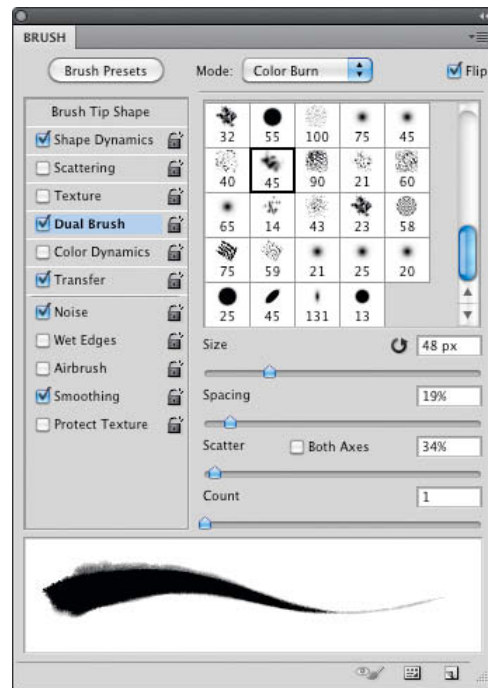
You can define a completely customized brush tip by using the Pencil tool with a really small (2 px) black tip to scatter a few dots on a new white canvas. Use the Rectangular Marquee to select these dots and define the size of your new brush tip preset. Now select Define Brush Preset in the Edit menu.

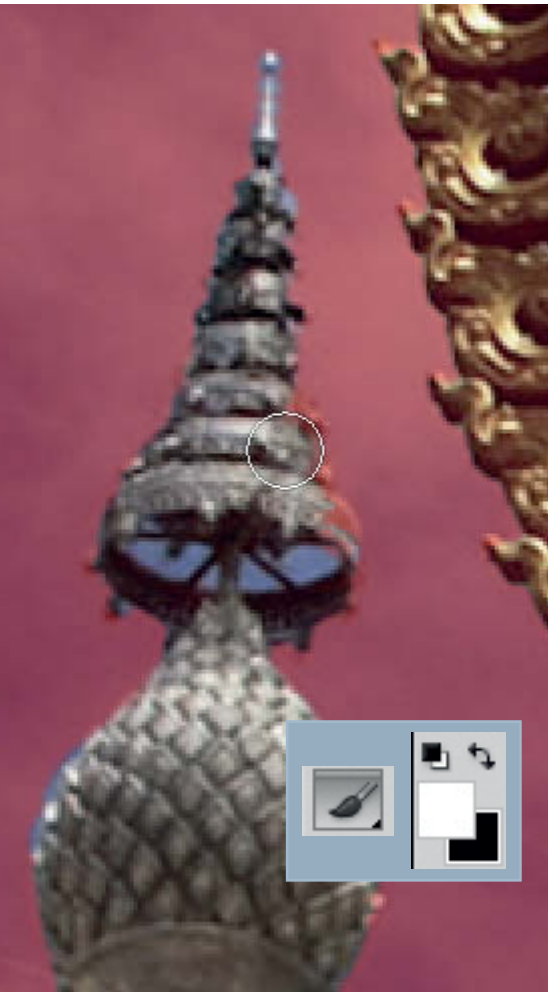


Your new preset will appear at the bottom of the list of Brush Presets. Use the Shape Dynamics options to define a suitable *Fade* value or use a graphics tablet to set the size of your brush using the tablet's pressure sensitivity controls.

Step 3

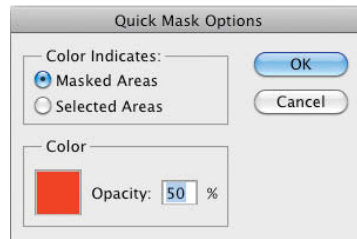
Photoshop CS5 saw the introduction of a whole new generation of brush tips alongside the already enormous range of options. You can now define parameters such as bristle length, thickness, angle and stiffness individually. A graphics tablet is a must if you want to get the most out of the choices this fantastic tool offers.





Quick Tip

If you switch from Quick Mask mode to the Channels panel, your mask will be displayed as a temporary channel. Double-clicking the temporary channel opens the Quick Mask Options dialog, where you can select the mask's color and opacity. If necessary, you can also invert the color to mark the selected areas instead of the masked ones.



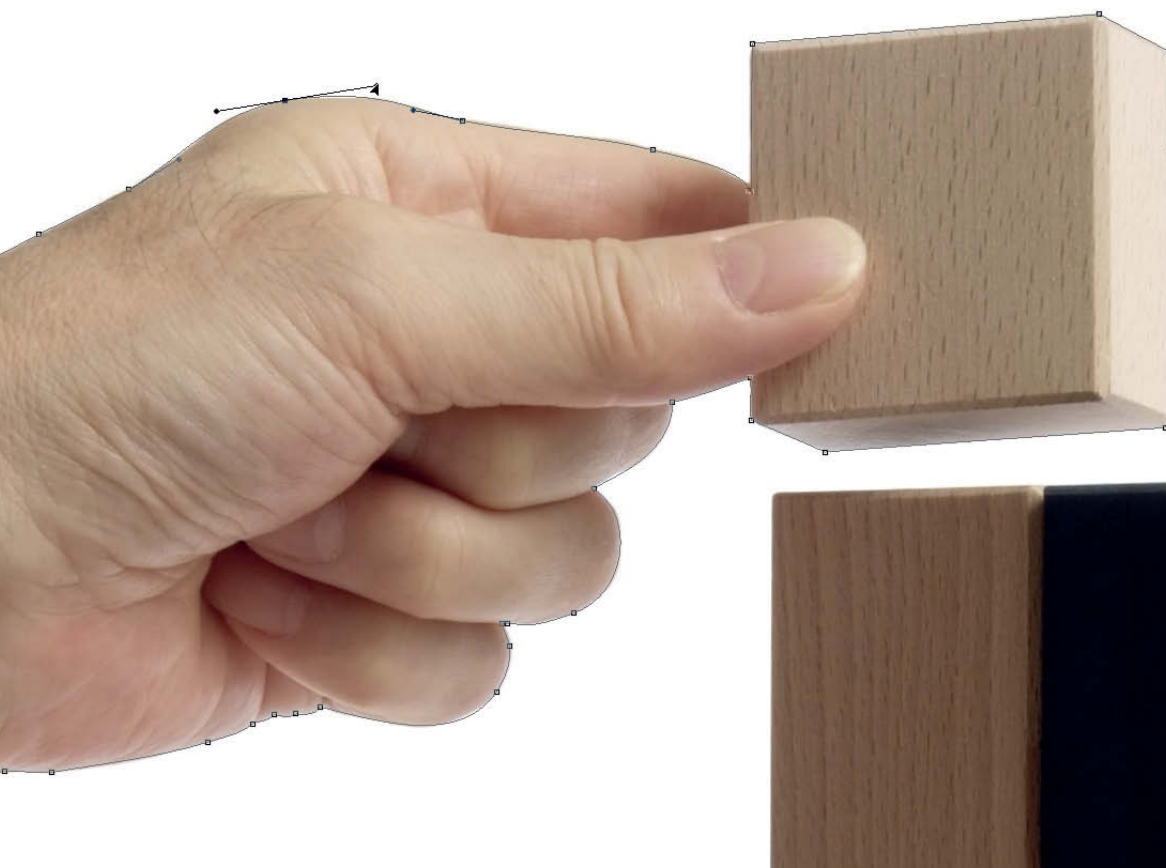
Use the Refine Radius tool to correct minor errors in Quick Mask mode

performed using black and white pixels, as they are in a layer mask or when you are working on a separate channel. This way, you can correct major flaws with a brush, and, if required, apply a global feathered edge using a Gradient.

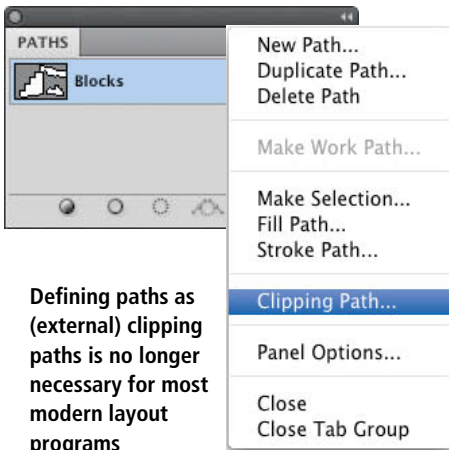
In Quick Mask mode, in a channel or in a layer mask, you adjust a black-and-white or grayscale image using any of the pixel-based tools available to you. The most widely used tools are the Brush (with varying hardness settings), the Gradient tool, Blur filters, and the Dodge and Burn tools. Always use the available options to the full, whether these be different brush hardnesses or varying opacity and exposure settings. The Brush Tip options are extremely wide-ranging and you can even use them to define your own brushes. The Dodge and Burn tools are based on traditional darkroom development techniques and can be used to selectively adjust highlights, shadows and midtones, or to precisely apply partial masks that extend or delete parts of a selection.

Paths and the Pen Tool

The Pen tool and the Paths it produces are a relic from earlier times when paths were the only selection tools that most layout software was able to interpret. Nowadays, layout programs like Adobe *InDesign* are able to process alpha channels and layer masks and all their transparent and semi-



The Pen and Direct Selection tools use Bézier curves to produce precision edges in selections



Defining paths as (external) clipping paths is no longer necessary for most modern layout programs

transparent data. Nevertheless, many experienced graphic designers and creative users still like to use paths, if only because the Pen tool uses the same anchor points, tangents and Bézier curves that they are used to. Path creation works exactly the same way as it does in *Illustrator* and *InDesign*: a click creates an anchor point, while clicking and dragging creates a curve. If you press the Alt key while drawing a path you can alter the position of the anchor point. You can alter every corner, curve and smooth point later too, by clicking and shifting an anchor point with the Ctrl/Cmd key pressed or by using the Direct Selection tool (the white cursor arrow).

Completed, temporarily saved paths can be saved permanently in the Paths panel in a similar way to the alpha channels described

earlier. Saved paths can then be loaded as selections using the Ctrl/Cmd key.

A path has to be defined as a Clipping Path using the options in the Paths panel menu if you want to use it as a selection that can be interpreted by older layout software. Leave the Flatness box empty if you want the smoothness and complexity of the path to match the output resolution of your printer.

Mask Editing Tools

To transform a selection into a layer mask, simply click the *Add a mask* button at the bottom of the Layers panel while your selection is active or click the thumbnail in the Masks panel if you want to create a mask for the background layer. Once you have transformed your selection, you can edit it using all the usual tools as well as the additional fine-tuning options included in the Masks panel.

The advantage of the Masks panel is that it shows the effects of the adjustments you make to your selection in real time. To temporarily hide the mask, simply click the eye icon next to it in the Masks panel or click on the layer mask icon in the Layers panel with the Shift key pressed.

In addition to the Density, Feather and Color Range options, the Masks panel also offers the Refine Mask dialog, which contains exactly the same options as the Refine Edge dialog described earlier. These include:

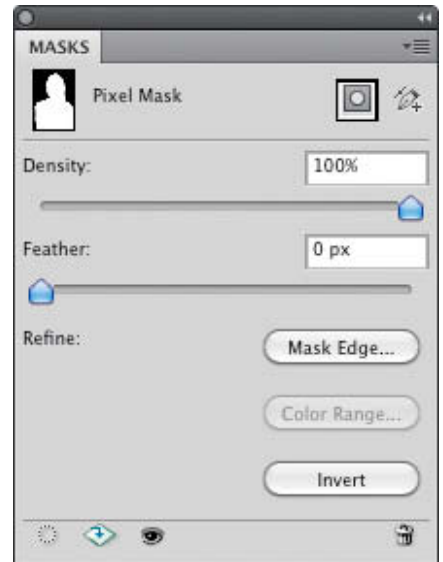
- *Smooth*: smooths obviously pixelated edges
- *Feather*: creates a transparent transition with the selected pixel width
- *Contrast*: sharpens edges that are too soft
- *Shift Edge*: globally increases or decreases the size of the selection

The View Mode selector is used to select your preferred display background.

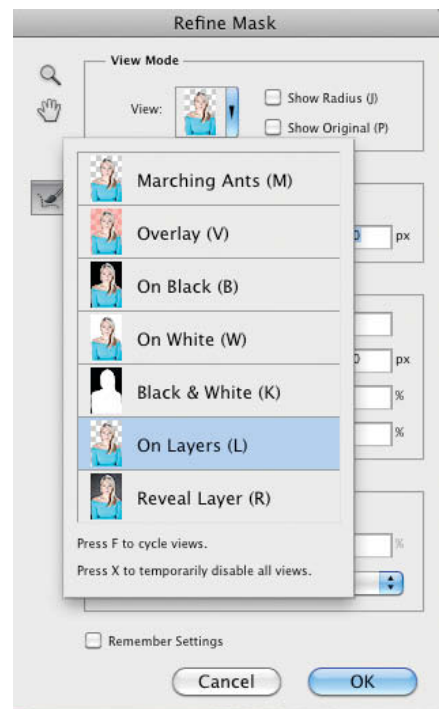
The additional Smart Radius function was introduced with *Photoshop CS5*. This option automatically detects the optimum selection edge radius but also allows you to adjust the results using the Refine Radius tool. This creates a broader zone along the original selection edge that is subject to dedicated reinterpolation – a great solution for the ‘frayed’ edges that often occur when you are selecting fur or individual hairs. In many cases, it makes sense to give a selection a custom radius using the Brush rather than just applying a standard radius to the entire selection. As when making a selection, you can adjust the radius setting using the Alt key.

Colored fringing (i.e., the remains of the original background) is a common artifact that remains after making complex selections, and the *Decontaminate Colors* option in the Output section of the dialog offers a solution.

Activating this option reinterpolates the edge pixels of a selection, removing any extraneous colors while simultaneously creating a new layer mask in order to prevent image data loss. This is great in theory, but is not perfect in



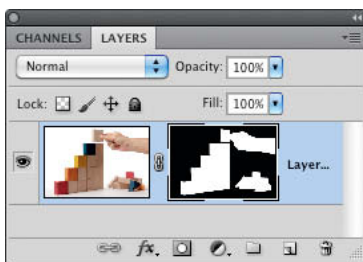
The Masks panel gives you direct access to all of the most important selection editing options



The Refine Edge and Refine Mask dialogs both contain a wide range of viewing options

Quick Tip

Paths can be scaled steplessly without any loss of quality. This is one of the advantages of working with vectors rather than pixels. Vector masks fulfill the same function as layer masks and are also losslessly scalable.





This photo provides a perfect demonstration of *Photoshop's* automatic edge detection functionality. Critical areas that are not detected automatically can be selected manually using the Refine Radius tool.

practice, often producing results that are too monochromatic and not particularly realistic.

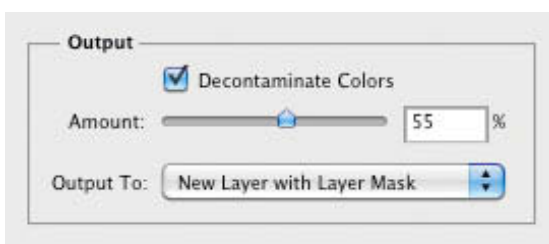
Reducing the Density setting in the Masks panel can brighten black pixels by making the masked portions of the background more transparent. The great thing about the Density slider is that you can adjust it up or down at any time. The same is true of the

Feather setting in the Masks panel, making it superior to the version included in the Refine Edge/Refine Mask dialog.

The final option in the Masks panel is the Color Range dialog, which allows you to modify the colors in your selection. The tool works in the same way as the corresponding one in the Select menu, and uses an

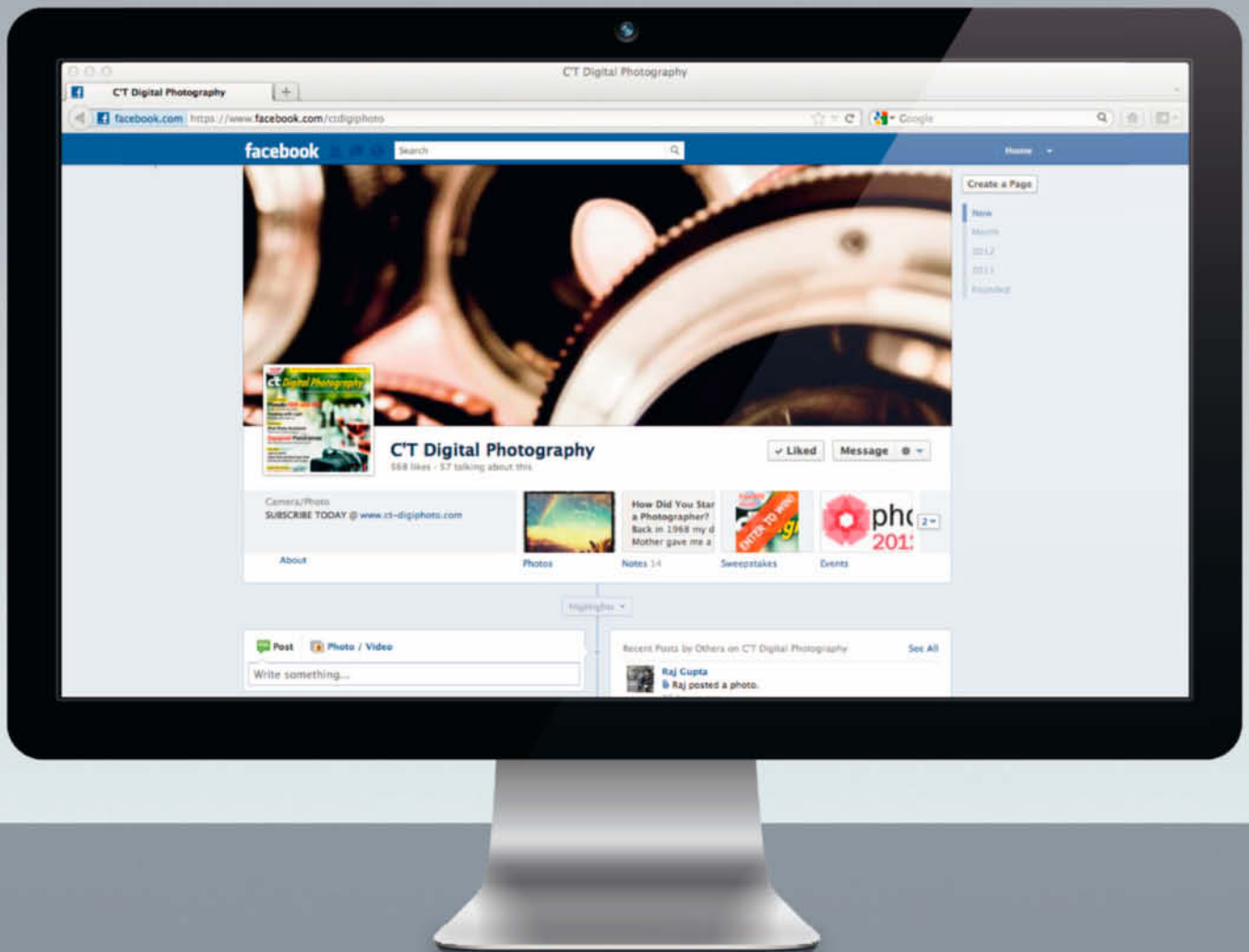
eyedropper to select the colors that you want to include in a new layer mask.

The new *Localized Color Clusters* option determines the zone surrounding the original selection in which color selection is to take place. This prevents unwanted colors from other parts of the image from accidentally becoming part of the selection.



The Decontaminate Colors option is a small slider that sometimes has a big effect

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Common Selection Techniques

For subjects with monochromatic or uniform backgrounds, it is often possible to make perfectly acceptable selections using the Magic Wand tool. However, using the Color Range dialog can be simpler and more effective. The Color range command in the Select menu enables you to select colors using an eyedropper either in the image itself or in the mask preview. Once again, you can add selections using the Shift key or subtract them using the Alt key. The Fuzziness setting determines the tolerance of your color choice. The new *Localized Color Clusters* option helps you to build a more accurate mask if you are selecting multiple color ranges in a single image, and the Range slider controls the radius of the selection thus made.

Objects with Clean Edges

Objects with clear-cut edges (even on non-uniform backgrounds) can usually be effectively selected using the Quick Selection tool. But don't forget to fine-tune your tools: a small tip reduces the selection radius and you can remove erroneously selected areas by pressing the Alt key during selection. You can,

of course, make this type of selection in Quick Mask mode too, although you will often find that the original quick selection only requires a little smoothing using the Smooth tool in the Refine Edge dialog.

Simple shapes can also be effectively selected using the Pen tool – provided of course that you are comfortable with using paths. This approach means you can track the edge of an object precisely as you work and don't have to correct any mistakes that an automatic tool might make. Not only that, but you can easily edit paths using the (cursor) selection tools, should you need to.

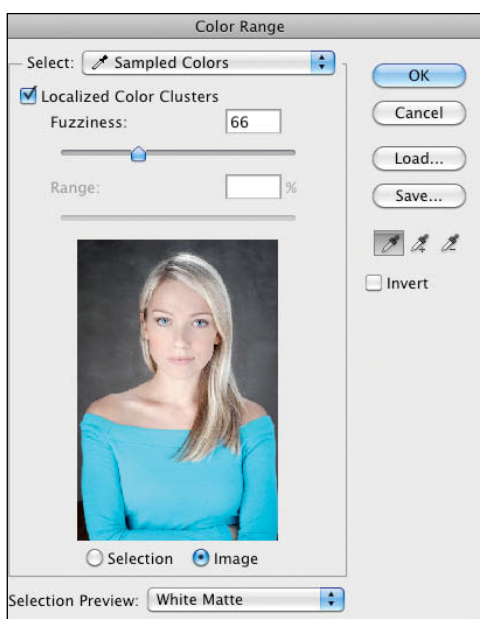
Blending Modes

Some apparently complex selections are easier to perform than you might think. Multiply blending mode makes it easy to transplant dark structures such as tree branches at sunset can be easily transplanted onto a new background using , while bright details can equally effectively be given a new background using Screen blending mode. This approach is often used for rescuing valuable edge pixels in selections that involve hair or fur.

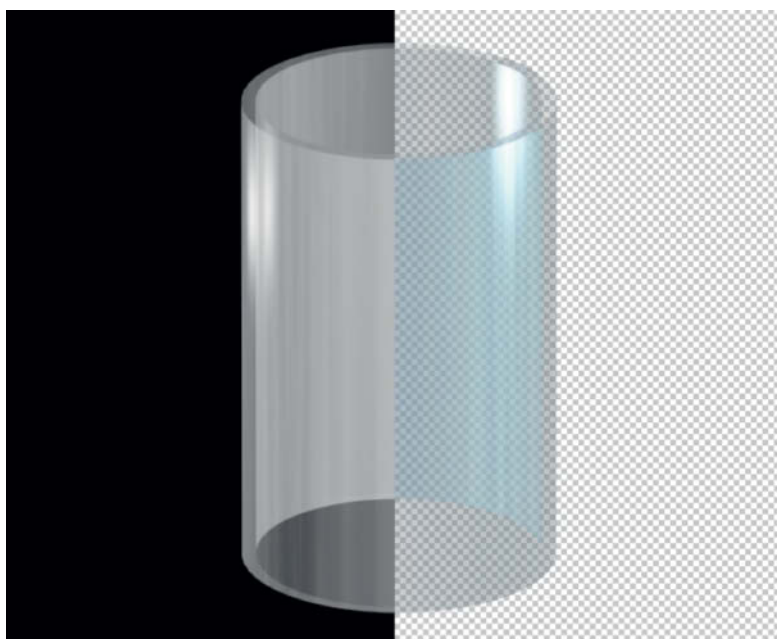
Transparent and Semi-transparent Objects

Semi-transparent objects such as glass or gauze can be quite simple or really challenging to select. One approach is to make a luminance selection in the Channels panel: click on any channel with the Ctrl/Cmd key pressed to create a selection that encompasses the luminance data stored in that channel. This technique produces very finely graded selections, and no selection tool can differentiate so well between different levels of transparency. Again, this type of selection can be fine-tuned using the Refine Mask dialog, where the Shift Edge slider can be used to increase or reduce overall transparency. Use the Contrast slider to sharpen soft transitions.

Here too, *Photoshop* offers us an alternative approach. Double clicking the layer you wish to select from opens the Blending Options dialog, where you can use the 'Blend if' sliders to seamlessly show or hide light or dark image areas. It is particularly important to use the Alt key to keep your transitions soft when using this technique. The advantage of this particular approach is that you can alter your selection



You can make Color Range selections either directly in an image or in the preview window. The same options are also available in the Refine Mask dialog.



The luminance selection is shown on the left and the corresponding 'normal' selection on the right

at any time, although it won't be visible in the Layers panel.

Fur and Fraying

The Refine Mask/Refine Edge dialog is a real boon when it comes to selecting fur, hair or any subject that shows signs of fraying. It is important to ensure that your rough selection doesn't contain any background pixels – you can use the Refine Radius tool's edge detection functionality to work on the edges later. Select a View mode that gives a good overview of the active selection and non-selected details at the edges of your object. You can then use the Refine Radius tool to mark areas where you want *Photoshop* to select edge pixels – the rest of the selection will be added automatically. This process works very well for evenly textured subjects such as animal fur and, if things don't quite work out, it is usually sufficient to redefine the selection zone slightly using the Smart Radius slider. The exact location of the current radius can be displayed by selecting the *Show Radius* view mode option.

Selecting Hair

Human hair still presents the ultimate selection challenge, and there is no single technique that is guaranteed to do the trick. The usual starting point is a mask based on the channel with the highest contrast plus



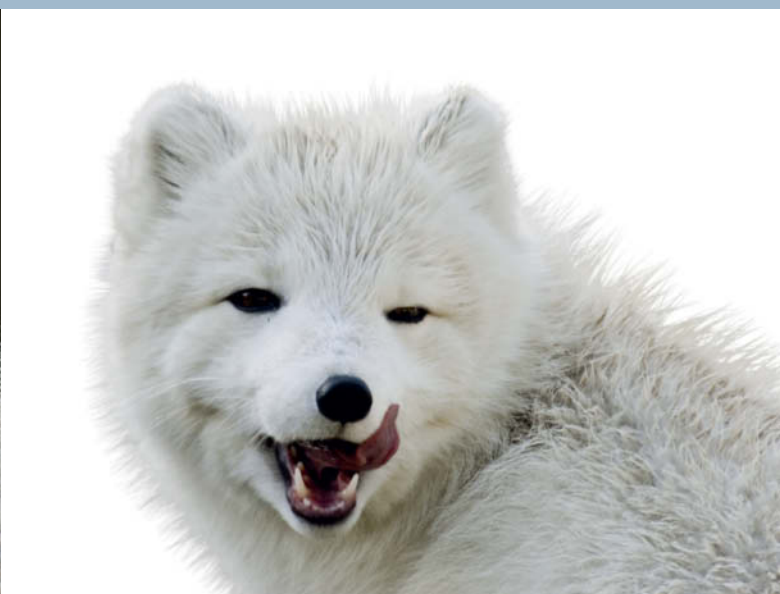
These eyeglasses are not selected but instead blended using Multiply blending mode. A couple of details in the frames were added using a mask.

a few tonal corrections. An appropriate channel often has to be created using the Calculations dialog, and it is common for a mask to be constructed of various separate components that use different selection techniques for individual image areas. Combining channels is just as simple as combining selections.

Various techniques are required to complete the details of a hair mask. One option is to use the automatic edge detection

functions in the Refine Mask dialog, but applying Dodge and Burn effects manually is generally more accurate when it comes to slight differences in masking for single strands of hair. The Blur tool is also great for softening details that have turned out too sharp during a first run-through.

The quality of a selection really only becomes evident when the object is mounted onto a new background – and that is when the work really starts!



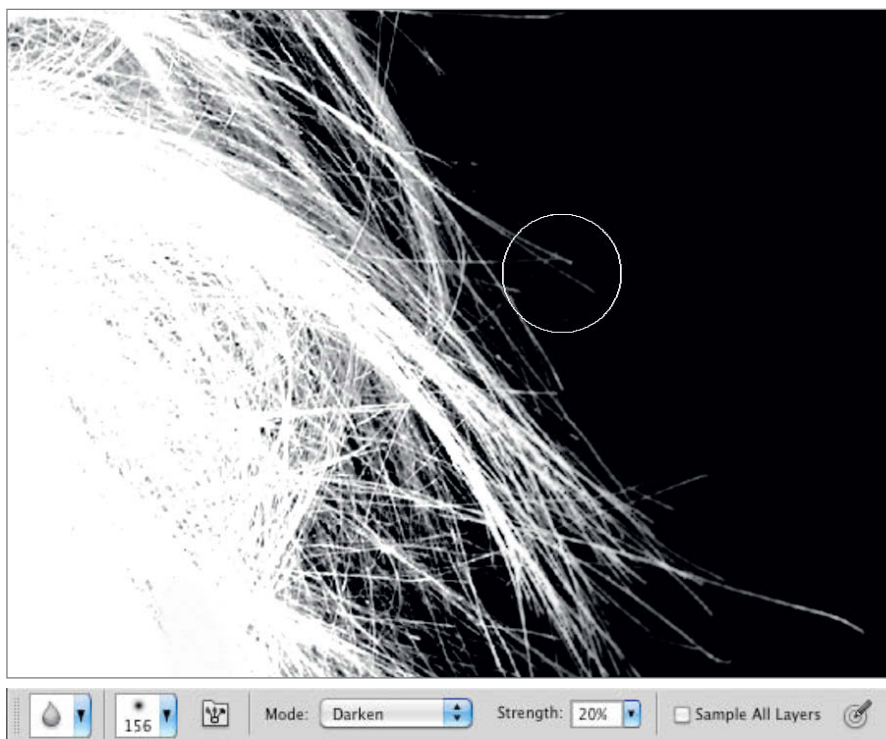
Photoshop's automatic edge detection functionality made selecting these fur details a quick and easy task

The Perils of Photomontage

The moment of truth comes when you insert your selection into a new background. This is when all those pesky little background pixels that you weren't able to see against a transparent working background show up.

Bright colors in the remaining pixels are difficult to remove, but even neutral-colored background pixels show up strongly if you are switching from a bright to a dark background or vice versa. Such edge artifacts are relatively

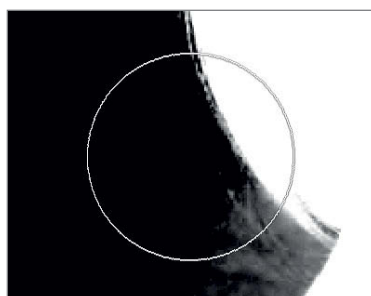
simple to remove, although manual corrections using layers and various tools usually produce better results than the automatic tools built into the Refine Edge dialog.



The Dodge, Burn and Blur tools are great for fine-tuning hair masks

Quick Tip

Use low exposure values when applying Dodge and Burn effects. This way, you can build an effect gradually rather than running the risk of applying too much at the first attempt.



Decontaminate Colors

The new *Decontaminate Colors* option in the Refine Edge dialog offers an antidote for color fringes at the edges of selections. The tool replaces fringe pixels with the color of nearby fully selected pixels and, because the process alters the image data, stores the result in a layer copy with a new layer mask. The theory is great, but the practice often produces blocky results and sometimes even fails completely.

The alternative is to recolor the fringe pixels manually. This approach gives you more flexibility and allows you to work more sensitively than a preset automatic tool. Use the Color Replacement tool and place its crosshairs in the middle of the colored area you want to correct. The Amount value ensures that only similar-colored pixels get recolored (much like the Color Range Fuzziness setting). If you alternate between selecting unwanted colors and selecting surrounding replacement colors (using the Alt key), you can produce really smooth, seamless edges. Surrounding pixels with the same color as your new background are also great for recoloring fringe pixels.

Using Layers

If fringe pixels are evenly distributed along the edge of a selection, you can correct them on a separate layer. To do this, duplicate the layer that contains your layer mask and use the *Shift Edge* option in the Refine Edge dialog to reduce the size of the duplicate selection by one or two pixels. You can then use Multiply blending mode to blend the pixels in the lower layer that extend beyond the new edge to make them darker than the background itself. You can apply the same technique to bright fringes using Screen blending mode to blend unwanted pixels into a bright background (see the *Correcting Fringing* section on page 68).

Selective Extension and Subtraction

It isn't possible to edit a complex hair mask using conventional brush tools, as these would simply produce strange-looking stripes and brush-strokes. Even using a custom brush tip, you will need to apply a lot of manual corrections to produce a realistic-looking result.

If you want to adjust only part of your mask, remove a couple of particularly stubborn fringe pixels or emphasize a particular strand of hair, the Dodge and Burn tools are probably your best choice.

Even if their functionality is comparatively prehistoric when it comes to retouching normal image pixels, these tools can be extremely useful for tweaking the edges of selection masks. Limiting the effect of these tools using the *Highlights* or *Shadows* options enables you to brighten or darken the appropriate pixels without altering the corresponding white or black parts of the mask, thus enlarging or reducing the overall selection.

Partial Blur

Sometimes, individual strands of hair are captured out of focus or parts of a mask end up looking unnaturally sharp. In order to get rid of fringe pixels in these areas, you have to blur the mask. Take care to use low Strength settings when using the Blur tool and never use Normal mode, as this produces uniform gray pixels in the mask, which then allow the background to show through. If you use Darken mode, the mask will be blurred and the selection will become smaller.

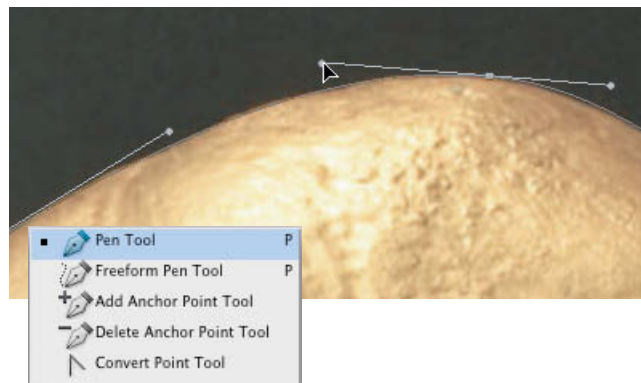
1. The rough selection. This worked well, but the edges require attention.
2. The Decontaminate Colors tool has visibly improved the situation
3. Placing fringe pixels on their own layer makes it possible to blend them with the background without having to recolor them



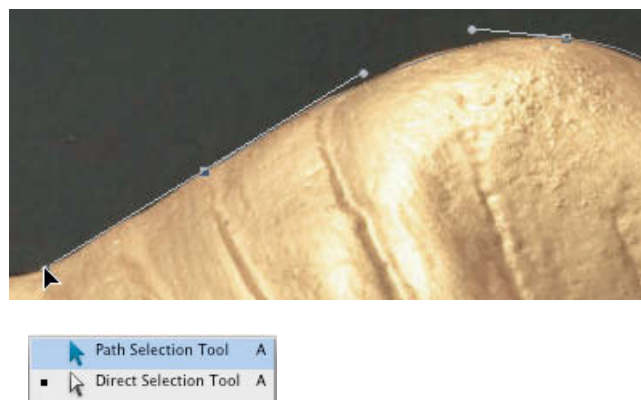
Up Close and Personal with Pen Tools and Paths

Using paths is not an especially modern way to make selections and is a technique that only really works for simple shapes with obvious edges. It is nevertheless useful to know how the Pen and Direct Selection tools work, and you can often use them to produce more accurate results more quickly than you can using contemporary automatic pixel-based tools.

Step 1 **Working with the Pen tool:** The Pen tool is simple to use but takes some getting used to. If you are experienced in using vector-based drawing programs like *Illustrator* or *InDesign*, you will find it a lot easier than if you are just starting out. A simple click creates an anchor point, while dragging the cursor with the mouse button pressed produces a curve whose characteristics (i.e., steepness and length) are defined by an accompanying tangent.

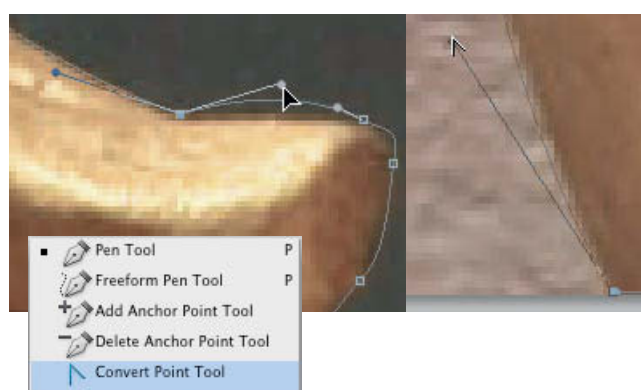


Step 2 **Adjusting a path:** The fewer anchor points you create the better. Curves with too many anchor points are often bumpier than they need to be. Don't be put off by small imperfections in your path – you can correct these at any time while you are drawing or later when your path is finished. Select the Direct Selection tool either directly in the Tools panel or by pressing the Ctrl/Cmd key, which also automatically switches you back to the previous selection tool that you used. The Direct Selection tool can be used to select and shift individual anchor points or direction points.



Step 3 **Converting Points:** The Convert Point tool changes the nature of anchor points, and allows you to turn corner points into smooth points and vice versa. Clicking on a curve point with this tool collapses its direction points or converts anchor points into curve points by clicking and dragging to form a new curve.

Pressing the Alt key while you are using the Pen tool automatically switches to the Convert Point tool.



Step 4 **Curves with multiple segments:** Clicking on a direction point with the Convert Point tool separates the curve's tangent into two parts and defines two new, separate curves on either side of the curve point. This is fine if you do it deliberately, but it often happens unintentionally. Curve points represent

connections and transitions that are used regularly – for example, to add a curve to the end of a straight segment or to select organic shapes that don't precisely match the shape of the system's automatically generated splines.

Step 5

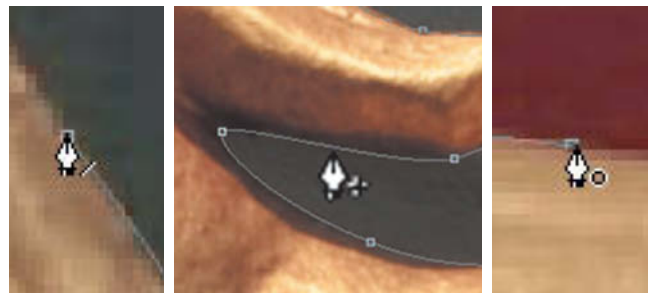
Completing a path: The Pen tool does many things automatically – for example, if you have corrected a path and you want to carry on from your previous end point, all you have to do is click on it. The icon with the slanted tangent symbolizes the connection with the existing path.

If you move the cursor to the start point of a path, the circular icon symbol indicates that clicking there will close/complete the path.

If you move the cursor over the middle of an existing path, a 'plus' symbol indicates that you can add anchor points to it. A 'minus' symbol indicates that you can delete an existing anchor point by clicking it. There are separate commands for performing both of these tasks, but the Pen tool's built-in automatic functionality makes them redundant.

Quick Tip

When using the Pen tool, use keyboard shortcuts to switch to the other correction tools when necessary. The Ctrl/Cmd key activates the Direct Selection tool and the Alt key activates the Convert Point tool.

**Step 6**

Path area options: If you want to add or subtract paths or parts of paths, you can use the path area option buttons in the tool's options bar. The options include adding a new area to an overlapping path area, removing a new area from an overlapping path area, restricting a path to the intersection of a new area and an existing area, and excluding the overlap area in a consolidated path. To create an opening in your path, click the second option button before creating a new inner path.

**Step 7**

Saving a path: The path you are working on is displayed as a temporary work path in the Paths panel. To save a path as a permanent part of a file, double click the path thumbnail, enter a name for it and click OK.

**Step 8**

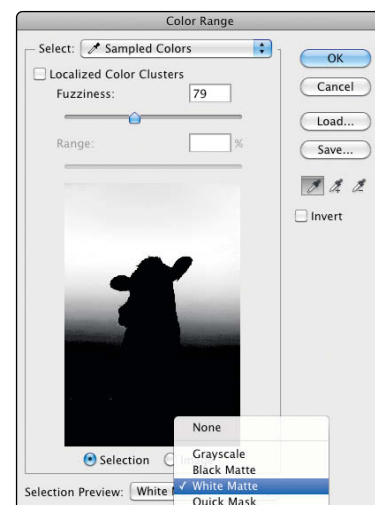
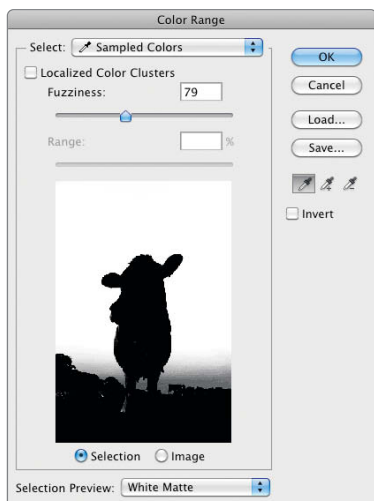
Convert a path to a selection: A finished path can be used as a selection path in layout programs like *InDesign*, or as a preset selection for making local corrections. A path can also be converted into a selection and later into a layer mask. There are many ways to do this, but the quickest involve either clicking on the path thumbnail in the Paths panel with the Ctrl/Cmd key pressed, or selecting the thumbnail and then clicking the 'Load path as a selection' button at the bottom of the panel.



Chroma Key – Selecting Colored Backgrounds

Blue screen and green screen (or ‘chroma key’) compositing techniques are widely used in the worlds of film and photography and are based on the fact that it is relatively simple to make selections using color values combined with appropriate fuzziness values. There are dedicated chroma key plug-ins available, which we will be looking at in future issues, but for now, we will describe how to produce chroma key effects using the options offered by the *Photoshop* Color Range dialog.

Step 1 **Select a color range:** Navigate to the **Select > Color Range** command. Click on the background color and check the white areas in the image in the main program window to see which parts of the image the current settings have selected. If the selection isn’t clear enough, select a different option in the Selection Preview pop-up menu.

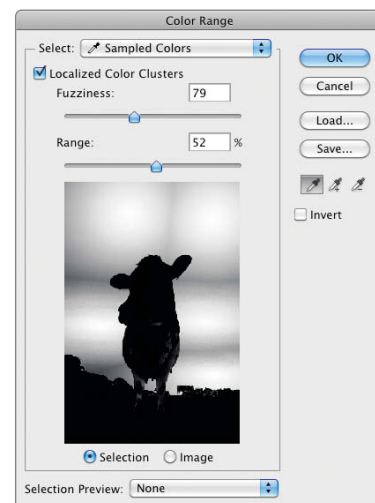


Step 2 **Extend your selection:** Press the Shift key and click multiple times in the preview image to add other colors to your selection. This process works in the Color Range preview window and in the main program window. You can also switch temporarily to the view in the main program window by pressing the Ctrl/Cmd key. At this stage, you should keep the fuzziness value low to prevent too much scattering.

Step 3 **Fuzziness and Localized Color Clusters:** Use the Fuzziness slider to extend your selection to include similar colors, but take care not to extend it too far by selecting too high a value. Activating the *Localized Color Clusters* option activates the Range slider that you can then use to limit the size of the area in which you can make a selection.

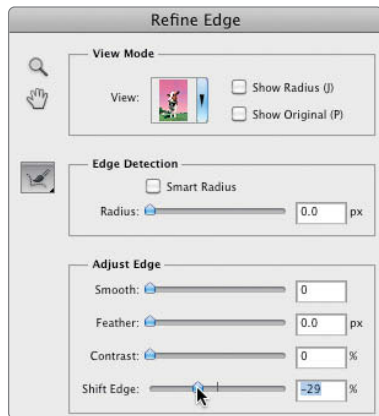
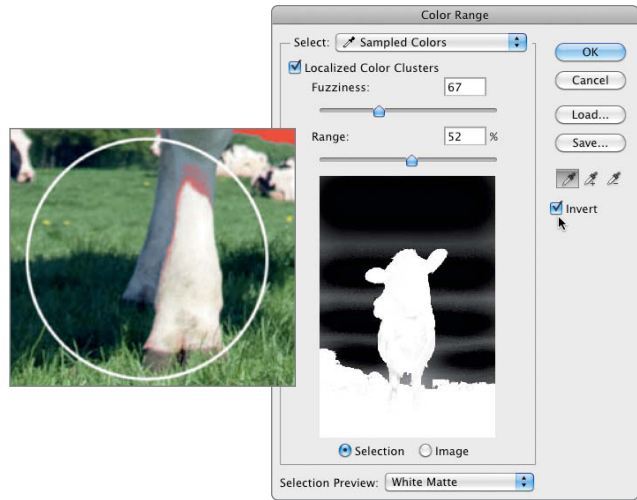


Step 4 **Remove unwanted color areas:** While fine-tuning a selection, you will often end up selecting too many areas that you don’t actually want to include. To remove them, simply press the Alt key and use the eyedropper the same way as before (Alt+eyedropper is also known as the ‘negative eyedropper’). Once you have removed any unwanted areas, reduce the Fuzziness value a little and continue with your selection. Repeatedly clicking the sky and Alt-clicking the foreground combined with slight adjustments in Fuzziness and Range will soon produce the results you are looking for.



Step 5

Fine-tune your mask: Because we are selecting from the background rather than the foreground, select the *Invert* option before clicking OK to confirm your selection. Now switch to Quick Mask mode using the **Q** key and correct any slight inaccuracies. Double click the mask icon in the Tools panel or the Quick Mask channel to open the Quick Mask Options dialog. This is where you can alter the opacity and color settings to make individual details easier to see. You can now use the Brush tool with black or white set as the foreground color to expand or curtail your mask. Pressing the **Q** key once again switches back to the normal selection view.



Step 6

Refine Edge: Now all we have to do is refine the edge of the mask. If the 'Refine Edge' button in the control panel is grayed out, switch to one of the selection tools or select the Refine Edge command from the Select menu. Select an appropriate view mode, as we did previously. Use the Smooth slider to smooth the edges and the Radius setting to increase the breadth of the edge region and include any lost details. The Contrast slider can be used to sharpen edges that have become too soft and the Shift Edge slider moves the position of the edge of the selection in and out to help you select just the right contents.

Step 7

Convert your selection into a layer mask: Once you have finished refining the edges of your selection you can select the *Layer Mask* option in the Output To pop-up menu. This creates a brand-new layer mask with your selection as its contents, which you can then fine-tune using the Brush tool with black and white foreground colors the same way as you can in Quick Mask mode.

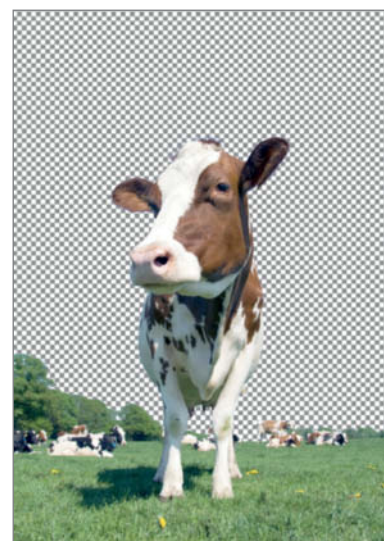
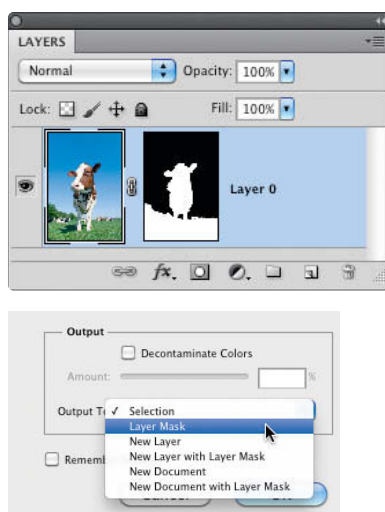
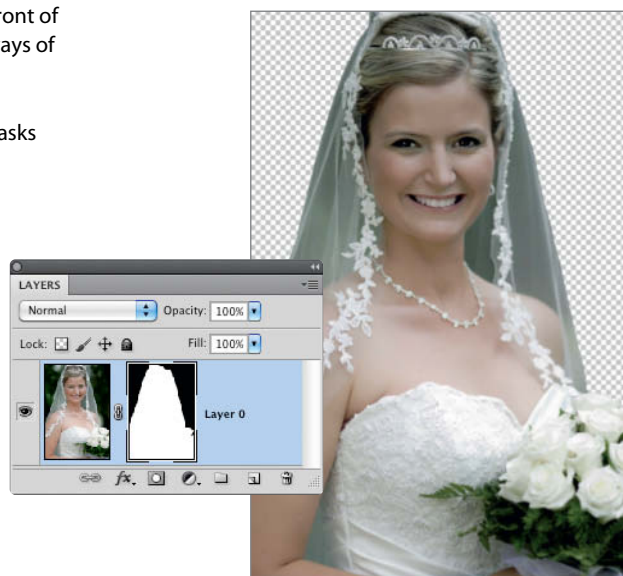


Image: Frank von den Bergh (iStockphoto)

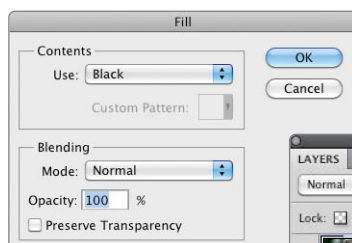
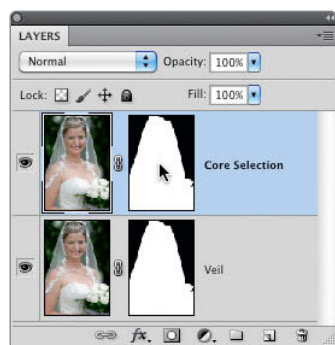
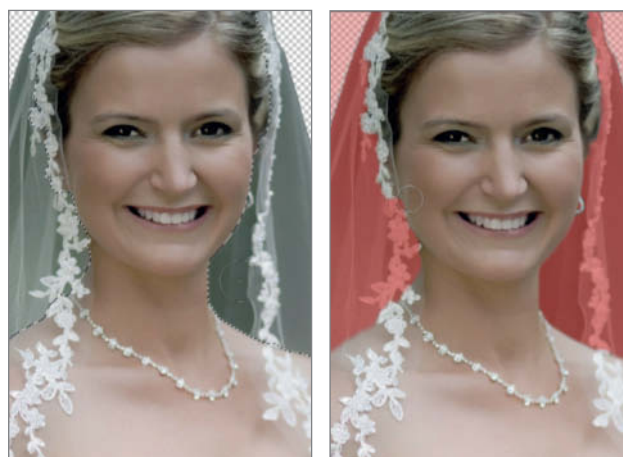
Semi-transparent Selections

Transparent subjects are tricky to select, especially if they are located in front of non-uniform or brightly colored backgrounds. But never fear, there are ways of working around this kind of challenge too. We discussed the luminance selection approach on page 54. This section uses a veil shot outdoors to demonstrate techniques for partially selecting image areas using layer masks and Layer Style options.

Step 1 **Make a rough selection:** Start by using the Quick Selection tool – fine-tuning comes later. Use the tool to roughly select the bride and her veil, then reduce the size of the tool and use the Alt key to subtract any unwanted details. Add a new mask from this selection and switch to the Masks panel and click on the mask icon. You have now made your rough selection.

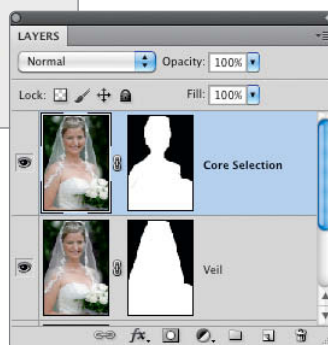


Step 2 **Make a new fine-tuning layer:** Duplicate this layer in the Layers panel and load the selection by clicking the mask icon with the Ctrl/Cmd key pressed. Press the Alt key so that a 'minus' sign appears in the center of the Quick Selection tool and select all areas that you want to appear transparent in the finished image. Switch to Quick Mask mode using the Q key or by clicking the mask icon in the Tools panel and continue to fine-tune your mask. Use the Brush tool with a hardness value of approximately 75% and white as the foreground color to extend the edge of the selection edge between the bride's face and body.



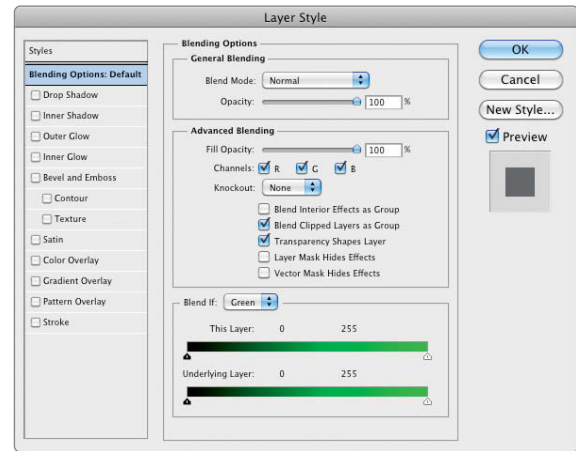
Step 3

Using the layer mask: Quit Quick Mask mode, invert your selection using the Shift+Ctrl/Cmd+I keystroke and activate the layer mask in the upper layer. Open the Fill dialog (in the Edit menu or using Shift+F5). Fill the mask's selection with 100% black. The upper layer's layer mask will now show only the core selection that we want to show completely.



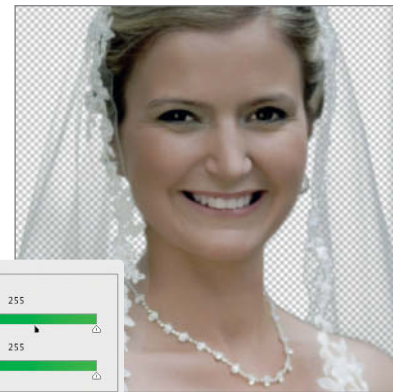
Step 4

Hide the background: Now switch to the lower layer where we are selecting just the veil. Double click the layer (not its name or icon!) to open the Layer Style dialog. Use the 'Blend if' options to hide the background behind the veil. To do this, switch to the Green channel using the pop-up menu. The upper scale represents all green tones on the current layer (from dark on the left to bright on the right). Move the black slider as far as possible to the right to completely hide all of the green background pixels. This is not yet an elegant solution to our problem, but is a good first step.



Step 5

Create soft transitions: Press the Alt key and move the left-hand half of the slider back down the scale. This creates a soft transition to the hidden green tones. Use both halves of the slider to adjust the hardness and scope of the color selection. This transition is independent of the changes you make to the edges of your layer mask.



Step 6

Fine-tuning: Create a new layer beneath the other two and fill it with an appropriate background color. This helps to judge whether the selection has worked – you can still edit the transitions by double clicking the veil layer. If the transitions between the layers are too hard, you can soften them in the layer mask using a soft brush. Obstinate colored pixels can

be neutralized using the Color Replacement tool. Select a neutral foreground color or pick it from your new image background and simply 'paint' over any obvious fringes.

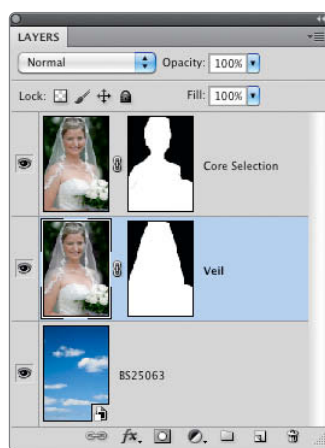


Image: Csondy (iStockphoto)

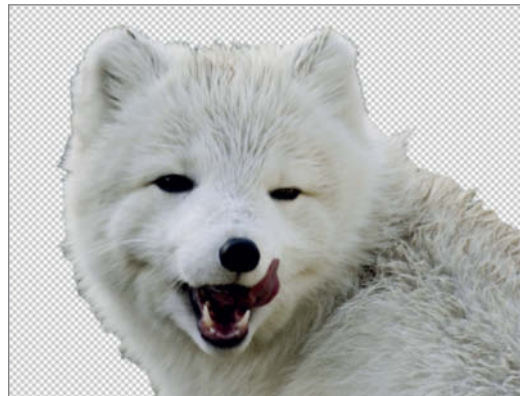
Shaggy Selections

Before the introduction of the Radius slider in the Refine Edge dialog, selecting fur and other non-uniform edges was just as difficult as selecting human hair. The slider transforms the edge of a selection into a kind of perimeter zone within which the program automatically detects the edges with the strongest contrast. The method is the same as the one used by the Extract filter that disappeared from the *Photoshop* repertoire with the introduction of *CS4*. The version built into the Refine Edge dialog, with its View modes and Shift Edge settings, is far superior to its predecessor.

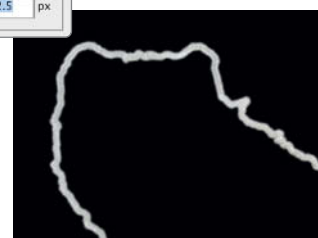
Step 1 **Create a core selection:** Even for a subject as complex as this, you can start by making a rough selection using the Quick Selection tool. Drag the tool around the entire subject, but take care not to include any background pixels at this stage. As before, you can deselect any excess using the Alt key. You can fine-tune your selection either by reducing the size of the selection tool or by switching to Quick Mask mode.



Step 2 **Check your results:** Click the 'Refine Edge' button in the control panel or navigate to the Select > Refine Edge command. Now select an appropriate view mode. Pressing the F key cycles through the various View Mode options. You can also press the L key to switch directly to the On Layers view, which displays the selection preview on a transparent background.

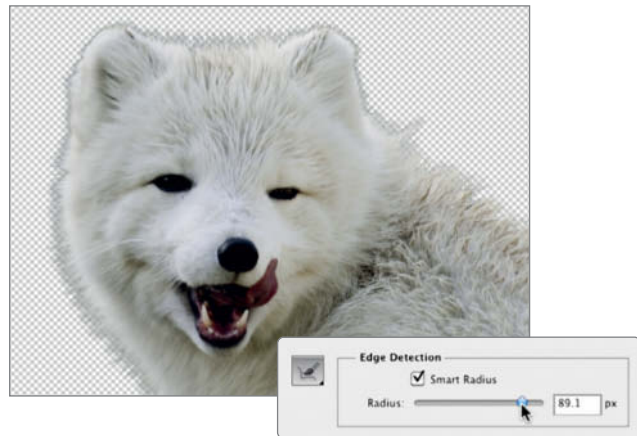


Step 3 **Select a Radius setting:** Start your fine-tuning by increasing the Radius setting. This automatically includes more details in the selection. Checking the *Show Radius* option displays a black mask that shows only the edge of the selection. The breadth of this line represents the Radius value you have selected and is the area within which the program will search for high-contrast edges. The edge of the selection will then be moved correspondingly to fit the new radius value.



Step 4

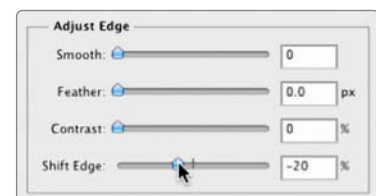
Activate Smart Radius: Deactivate the *Show Radius* option – this helps you to better judge the preview image. You may have noticed that some of the details in the selection are a little soft. If this is the case, activate the *Smart Radius* option. This uses a different algorithm and is capable of selecting edges with different degrees of contrast within a single radius. You will see that this improves detail definition within your selection. *Smart Radius* doesn't always produce better results than the conventional Radius slider, but you can use the various View mode options to help you judge which works best for your particular image.

**Step 5**

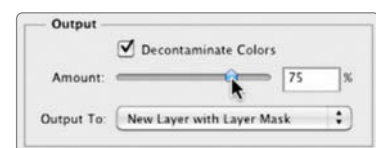
Manual Radius adjustments: You can also use the Refine Radius tool to selectively extend or reduce the radius of your selection so that it exactly matches the size of the details it encompasses. In this case, we simply 'paint' over the tips of the fur to adapt the radius zone to include details that don't yet lie within it. You can use the same technique to exclude details that belong to the core selection from the radius zone. Once again, pressing the Alt key switches the tool to subtract mode and allows you to erase any unwanted refinements you have made. Although this action appears to delete pixels, it actually only adjusts the Smart Radius.

**Step 6**

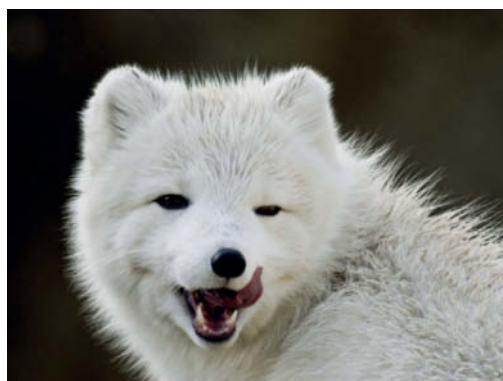
Shift Edge: Now use the Shift Edge slider to adjust the borders of your selection. Shift it inward with negative values or outward with positive ones. Shifting these borders inward can help remove unwanted background colors from selection edges. Take care not to move the slider too far, otherwise you might end up with a hard, unnatural-looking edge.

**Step 7**

Decontaminate Colors: This tool recolors background pixels instead of deleting them. Instead of adjusting the mask it analyzes the colors in the fringe pixels of your selection and recolors them using the color it detects in neighboring pixels. This works very well for the polar fox in our sample image. Moving the slider to the right increases the size of the area that the tool affects.



Because it alters the original image data, applying the tool automatically creates a new layer for the results. Select the *New Layer with Layer Mask* output option from the pop-up menu to preserve your original layer.



Selecting with Channels

Hair-based selections are some of the most difficult to master, and none of the techniques we have introduced so far work for this particular example. Conventional tools simply can't cope, color-based selections can't differentiate sufficiently between subject and background, and even Edge Detection – with its Smart Radius and Refine Radius tools – cannot adequately select the soft curls in our model's hair. The solution here is to resort to a combination of channels and conventional selection techniques.



Image: Mindundalk (Stockphoto)

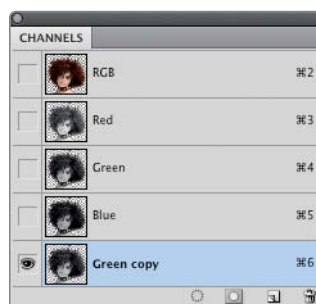
Step 1

The Channels panel: The red, green and blue channels are displayed as grayscale thumbnails, and their corresponding layers can be used to construct an effective selection mask. Click through the individual channels to see which makes the best base channel. The red channel is not suitable for this example because the model's hair and the background share too many tones. However, the green channel shows good contrast between subject and background and serves as the basis for our selection mask.



Step 2

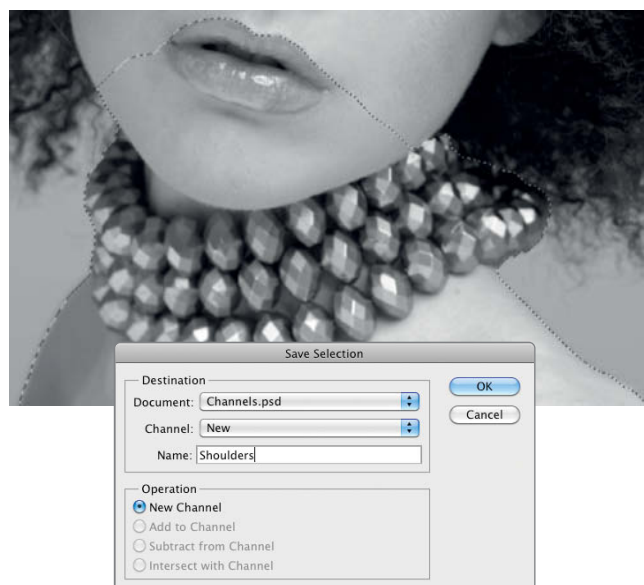
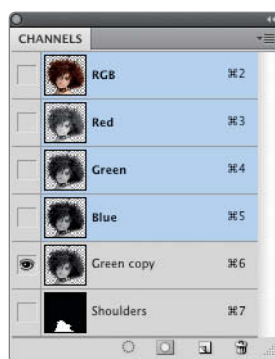
Copy the base channel: Duplicate the base channel via the Duplicate Channel command in the context menu or the panel menu.



Step 3

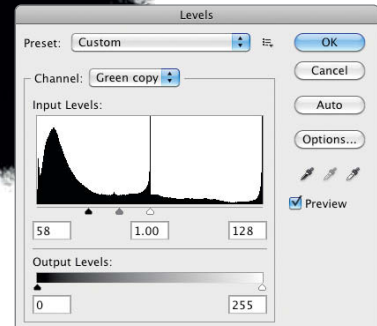
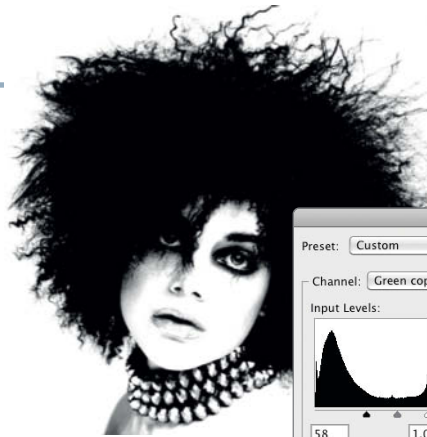
Save an additional channel: An additional channel is required later to deal with the model's shoulders separately from her hair. Select the shoulder area using the Magnetic Lasso or Quick Selection tools. Smooth the edges of this selection using the Smooth slider in the Refine Edge dialog.

Depending on your particular subject, it may be necessary to feather the edge slightly too. Navigate to the Select > Save Selection command and save your new selection as a new channel. This is now visible as a new alpha channel in the Channels panel.



Step 4

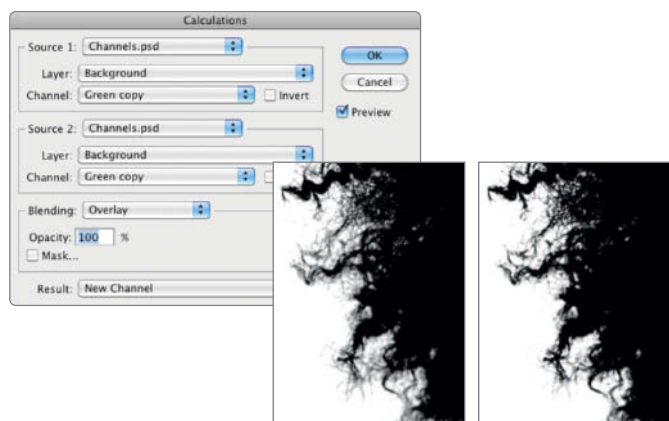
Building the selection channel: Now concentrate on separating the hair from the background. Start by correcting contrast in the copied green channel. Levels and Curves are both useful for this kind of adjustment, but Levels is easier to handle when editing critical transitions. Navigate to Image > Adjustments > Levels and drag the black and white point sliders toward the center of the scale. This reduces the number of gray tones and makes the edge of the selection clearer. However, be sure to retain a midtone zone that is 40-70 tones wide to help you create soft transitions in the extreme hair ends.

**Step 5**

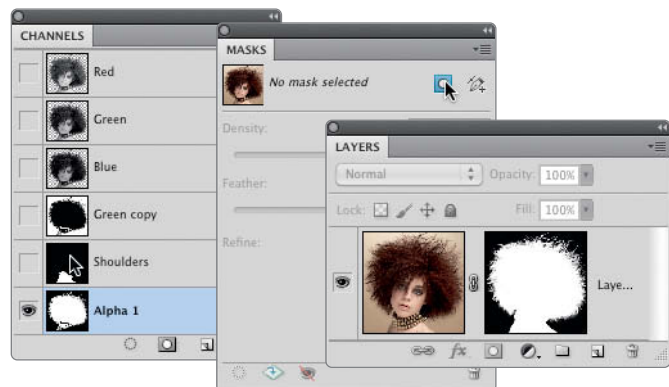
Brush-based corrections: The previous step concentrated on the selection edge at the hair ends. We now have to allocate the remaining foreground and background areas using the Brush tool. Set hardness to 100% and cover the remaining parts of the face in black. Here, you don't have to account for the zones that you have already saved in the new alpha channel.

**Step 6**

Calculate channels: Contrast corrections based on channels are often too intense. In such cases, you can perform a channel calculation, using blending modes to underscore the effect of a particular channel or combine the effects of multiple channels. Start with the edited green channel copy and navigate to Image > Calculations. Select the channels that you want to combine as Source 1 and Source 2 (in our case, these are the same) and select the *Overlay* Blending option. This underscores the effect of both bright and dark images areas.

**Step 7**

Merge channels: Invert the newly created alpha channel (Ctrl/Cmd+I) and combine it with your saved selection by clicking on the channel while holding down the Ctrl/Cmd key. Add the saved 'Shoulders' selection by pressing Shift+Ctrl/Cmd and clicking on the channel. At this point, the individual channels have served their purpose. Select the composite RGB channel to show the entire image and transform the complete selection into a layer mask by clicking the 'Add a pixel mask' button in the Masks panel.



Correcting Edges and Fringing Effects

This section fleshes out the example we introduced on the previous pages. We can only really see how good our selection is when we mount it on its new background. If color and brightness in the new background vary, fringing/halo effects are unavoidable. The following sections explain techniques that help to reduce fringing effects while retaining maximum detail in the individual hairs.

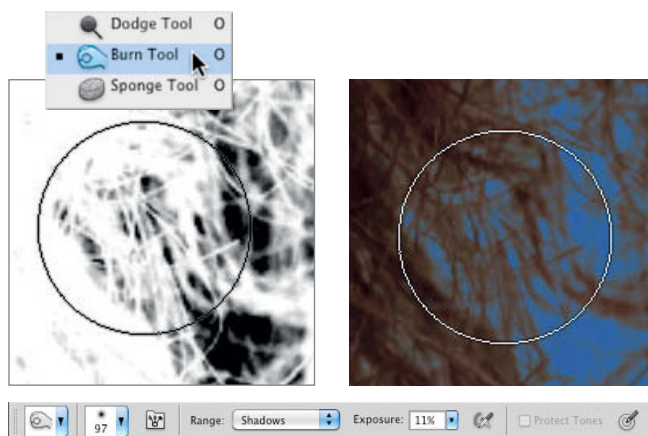
Step 1

Create a new background: Create a new layer and fill it (Shift+Del). Be sure to deactivate the *Preserve Transparency* option for the fill and select a color from the pop-up menu that contrasts with the old background color. This makes any remaining background pixels in the selection easily visible.



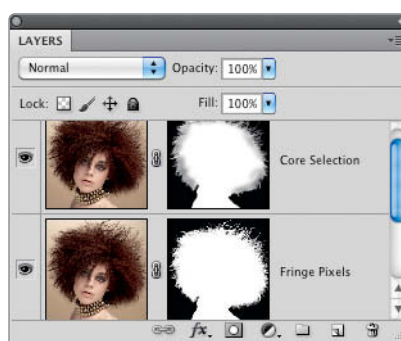
Step 2

Correct any remaining glitches: There are still some areas where the Levels adjustment failed to turn background or fringe pixels black. To correct these, click the layer mask and use the Burn tool to darken the mask in the appropriate places. Use the Shadows setting and work carefully using a maximum Exposure value of 15%. The tool won't affect the bright areas in the mask.



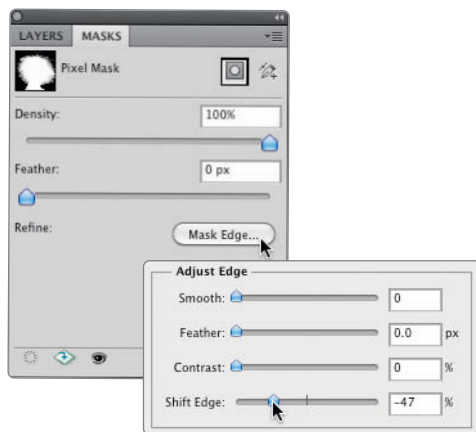
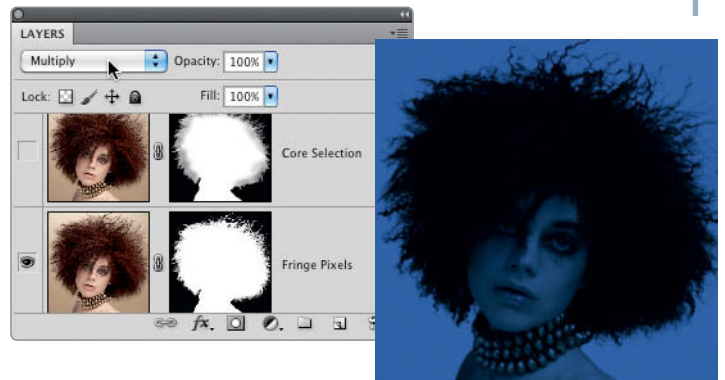
Step 3

Fringe pixels and core selection: You can, of course, correct all fringes using the Burn tool, although simply reducing the size of the selection's edge is not the most elegant solution. A more effective approach is to use the Layers panel to create two separate masks: one that makes the fringing in the details of the hair ends invisible and one for the main core of the selection. To do this, duplicate the selection layer and rename the two mask layers 'Core Selection' and 'Fringe Pixels'.



Step 4

Select a blending mode: Switch the blending mode of the lower of the two mask layers to Multiply. This makes sure that the pixels on this layer darken the pixels in the layer beneath (conversely, you can use Screen blending mode to correct dark fringe pixels that stand out against bright backgrounds). The next step is to make the core selection on the upper layer slightly smaller so that its bright fringes disappear and allow the dark fringe pixels that we have just created to show through.

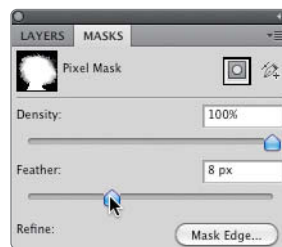


Step 5

Scale down the core selection: Activate the upper layer mask and click the 'Mask Edge' button. Use the L key to switch to the On Layers view mode in the Refine Mask dialog. This helps you to judge the interplay between the various layers. Use the Shift Edge slider to reduce the size of the selection. The bright edges will now disappear and the dark fringe pixels on the lower layer will show through.

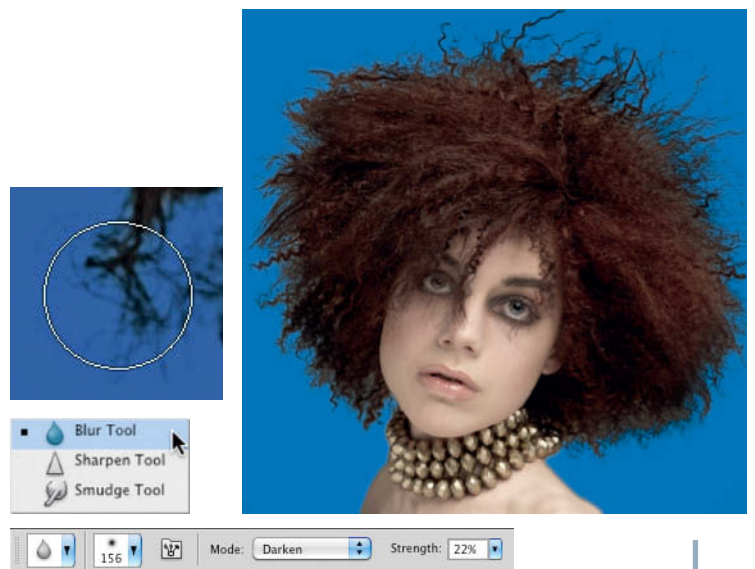
Step 6

Feather the transitions: If the transitions between the two layers appear too abrupt, you can soften the upper mask a little. But take care: if you introduce too much blur, the upper mask begins to expand beyond the edges of the lower one. Adjust the Feather setting either directly in the Refine Mask dialog or using the Feather slider in the Masks panel. The latter has the advantage of being adjustable at any time.



Step 7

Fine-tune the hair ends: Some of the 'sharper' hair ends still look a little unnatural and the mass of our model's hair still has to become a little more blurred to look realistic. Use the Blur tool to partially blur the mask. Be sure to use Darken mode if you want to avoid spoiling all the hard work you have already put into your mask. This way, the Blur tool only produces darker pixels that reduce the size of the mask. Use the tool on the lower Fringe Pixels layer, but have the image layer showing the whole time so that you can see the effect of your adjustments. Use a low Strength value to keep the effect subtle.







Petra Vogt

Time-lapse Photography

Time-lapse techniques allow you to make amazing short videos from sequences of individual images. We show you how to get started, which subjects are suitable and which software tools perform best at creating and optimizing time-lapse scenes. You'll find sample videos and source images on this issue's free DVD.

Cast your eye over a lump of dough or flowers in a vase, and they appear motionless, unexciting. But time-lapse photography can bring them to life. The results are impressive, but the secret behind their creation is comparatively simple: while a conventional film continuously shoots many images per second to capture the subject in a way that appears fluid to the human eye, the movement in a time-lapse sequence is based on a sequence of a few images shot over a longer period of time. When the video is played back later at normal speed, time seems to have been compressed – hence the name ‘time lapse’, which highlights the fact that there are gaps between the images.



Some cameras use a remote shutter release to shoot time-lapse sequences automatically

You don’t need video functionality in your camera because you actually compile the images into a sort of digital flip-book later, using a computer. The advantage over working with video is that you still have access to all the creative options of modern stills

photography, from user-controllable depth of field to the use of RAW format for more flexible image processing.

Interval Timers and Basic Equipment

While some other photo projects require a lot of time and complex equipment, you can shoot time-lapse films using very few accessories and you get to see the results very quickly. In many cases, all that is needed is a digital camera, and even a webcam or a mobile phone camera will do the trick. Some cameras have a dedicated interval timer function. If yours doesn’t, you will have to release the shutter manually at regular intervals or use a remote shutter release with built-in interval timer functionality.

You can buy a remote shutter release from major manufacturers like Canon (TC-80N3) or from third-party accessory makers. Asian manufacturers make models for Canon, Nikon and Sony that cost as little as US\$20, and for Olympus, Panasonic and Pentax from about US\$60. Most of these models are very similar in terms of the range of functions they offer, but check before you make a purchase how many shots you can set and the range of timer intervals (which should start at 1 second or more). It is also an advantage if the maximum number of shots can be set to infinity.

If you don’t want to purchase extra gear, there is a range of software-based solutions available that do a similar job. Although connecting the camera to a computer restricts mobility, the ability to make camera settings on a large monitor makes things much easier. Canon, for example, has been including a CD of its EOS Utility program with DSLRs for quite some time, and there are many iPhone and iPad remote control interval timer apps available. *DSLR Camera Remote* from onOne Software does the same thing for Nikon and Canon cameras, although the camera still has to be connected to a computer via wireless Internet or USB. There are also apps around

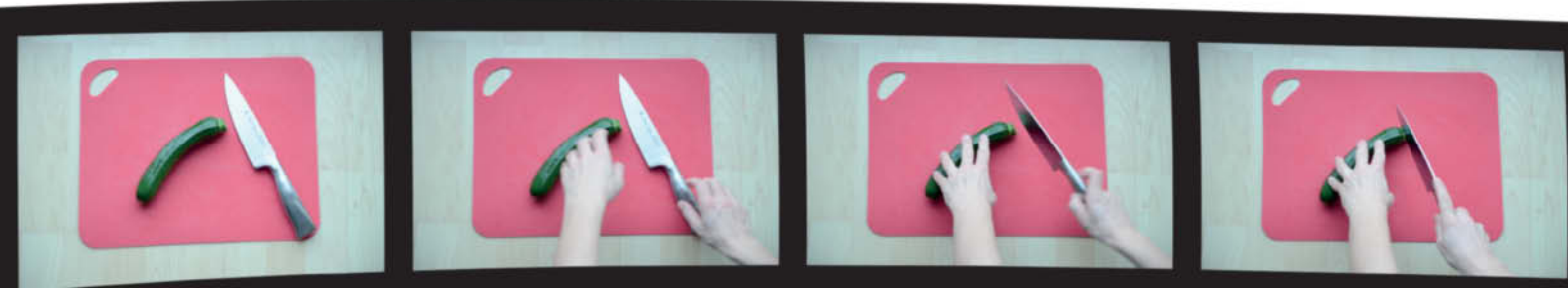
that use the built-in camera to turn your smartphone into a dedicated time-lapse photo camera. Owners of Canon compact cameras have the option of installing the CHDK firmware extension using an SD card. CHDK (chdk.wikia.com) is an open source project with no affiliations to Canon that extends the functionality of a wide range of Canon compacts to include – among many other things – an interval timer.

In addition to specialized control systems you will also need a stable base for your camera. A tripod is best, but if you have to improvise, a wall or table will do. Unless you want to include pans in your film, it is important that the camera doesn’t move at any time during the entire process if you want to get good results. Pans are, however, an advanced technique and are difficult to shoot smoothly without the use of expensive additional equipment. Inventive photographers like Hamburg-based time-lapse enthusiast Gunther Wegner have come up with innumerable ideas including a converted egg timer that serves as a rotating support for small cameras. If that sounds like too much work to you, you might find software-based pans more appealing (more on that later).

The Right Subject

Once you have assembled the basic equipment, you’ll be on the lookout for a suitable subject for your first time-lapse film. Any process that takes place over an extended period of time and in which no particular moment in the process is crucial will probably be suitable (see <http://vimeo.com/16917950>, for example). Good first choices include the setting sun or a growing plant.

As our examples on this issue’s free DVD show, everyday kitchen tasks can make very interesting subjects. Sequences of photos of ordinary things like dough rising or a person cutting zucchini suddenly become quirky animations when seen in time-lapse mode.





Situations with strong sunlight and heavy cloud are susceptible to flicker when shot using time-lapse techniques. Tools such as *LRTimelapse* are great for removing flicker effects.

Time-lapse films can be quite exciting, because they often allow us to see structures and processes that are invisible in real time. Our video *Berlin Alexanderplatz* is a good example. We photographed the square from above for a while but it was not until the images were played back at high speed that the patterns formed by large numbers of

people moving about in a public space became apparent.

With the subject settled, you'll want to make sure that you find the best possible conditions for capturing your images. For landscapes, for example, you will get the best results on fine days with a few clouds, as the sharp contrasts and outlines will emphasize

the time-lapse effect later on. A graduated gray filter will provide the necessary balance between sky and landscape, and a wide-angle lens will usually make the shot look more dramatic. With time-lapse subjects, it is generally worthwhile including a combination of moving and static elements in the frame. Try positioning a building or place of interest



in front of moving elements like clouds or pedestrians. Be careful, though, not to have too many moving elements, as they compete for the viewer's attention and your video will appear disjointed because of the lack of a central element.

Camera Settings

Since a time-lapse project is essentially about making a video, the individual photos have to be compatible with your chosen video format and your output device. This means that you need to shoot in landscape format with an appropriate TV-style aspect ratio. If you are aiming to make a 16:9 film, you'll need to check whether your camera can capture images at the appropriate resolution and whether the software recognizes the format you have selected. If necessary, you can crop your images to fit later on, although this can entail an awful lot of work. Once you have picked an image format, make sure that you have enough space on your memory card, fully charge the camera's battery and switch off the monitor preview.

It is a good idea to make as many camera settings as possible manually. Automatic exposure systems constantly fine-tune the camera's settings and are likely to produce a flickery final clip. The best way to prevent flicker is to set the exposure time, aperture, white balance and ISO manually. If the lighting is likely to change dramatically during the shoot (at sunset, for instance), using aperture priority auto mode at least ensures that depth of field remains constant. Switch off autofocus once you have made your initial test shots, otherwise you run the risk of the camera changing or even completely losing focus during the sequence.

JPEG is a more suitable file format for time-lapse shots than RAW, as it will be JPEGs that are required later to make the film and it is not necessary for any single shot to be top quality. Perfectionists who prefer more flexible post-processing

1.

Many Nikon cameras (including the D700 shown here) have built-in interval timer functionality. The options are similar to those available in many remote shutter releases.



2.

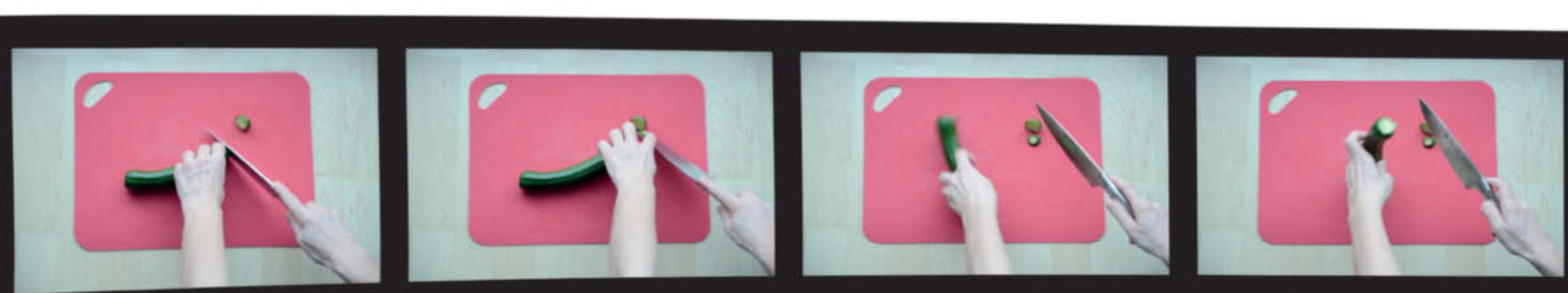
First, set the start time – either to 'Now' or a time of your choice



options can, of course, shoot RAW and convert the files later, but if you do, make sure that your camera can save large amounts of image data quickly enough to be ready for the next exposure in the sequence. If the camera is still writing data to the memory card when the next shot is

due, you will end up with gaps in your sequence.

When shooting JPEG, the camera can usually be set to a very small format, depending on your planned film or crop size. Full HD has a resolution of 1920x1080 pixels., which is smaller than the 'Small' setting in



3.

Next, enter your desired interval. 1, 5 and 10 seconds are some of the most frequently used settings.



4.

Then set the number of shots (like the 250 shown here). Nikon cameras are capable of taking multiple shots for each interval.



frequency should increase with the speed at which the subject is moving. For landscape shots that include moving clouds, an interval of between 1 and 10 seconds usually produces good results, while passing cars require a shorter interval. For growing plants, or other types of long-term action (such as the building project shown at www.ndr.de/fernsehen/sendungen/hamburg_journal/zeitrafferfilm100.html), intervals of minutes, days, or even weeks may be more appropriate. If in doubt, it is better to have too many images to choose from than too few, as it is easier to leave some out than to have to fill any gaps later on. If you find yourself getting impatient and want to get an idea of what your film is going to look like, most cameras have a 'Slide Show' playback mode for viewing your images in running sequence.

The main factor that influences the total number of exposures is the final length of the film. The number of exposures divided by the frames per second (fps) shooting rate will give you the total length of your film in seconds. By way of comparison, cinema films are usually shot at 24fps, while the PAL and NTSC television standards use 50fps (or 30 half frames per second in interlaced mode). If you have made 360 exposures over a period of half an hour, this will be enough to make a video that lasts 15 seconds using a cinema-style frame rate.

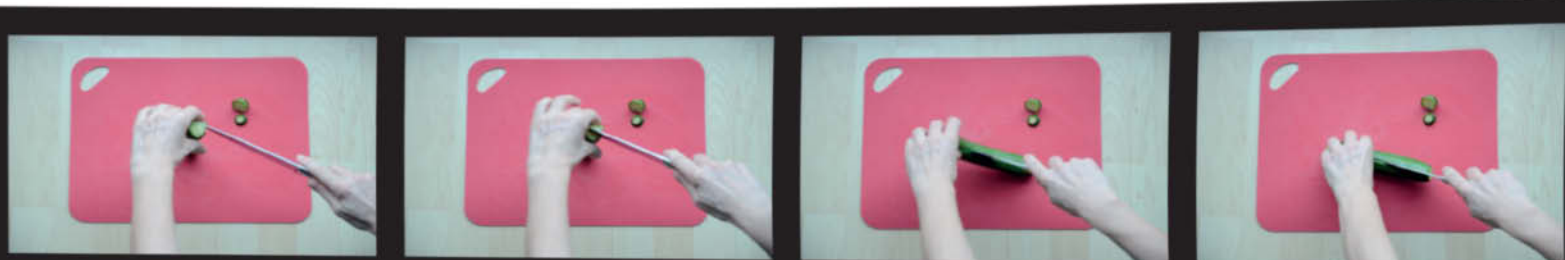
If it hasn't already happened, this will be the point at which stills photographers realize that they will have to adjust to making images on a completely new scale when they move into time-lapse work, and why factors like memory card space and shooting formats take on a new significance. Since increasing the number of images also increases the amount of time and work involved, we recommend that you stick to short sequences for your first attempts to get a feel for the medium. Taken at 5-second intervals, 100 source images will take 8 minutes to shoot, which is a good place to start.

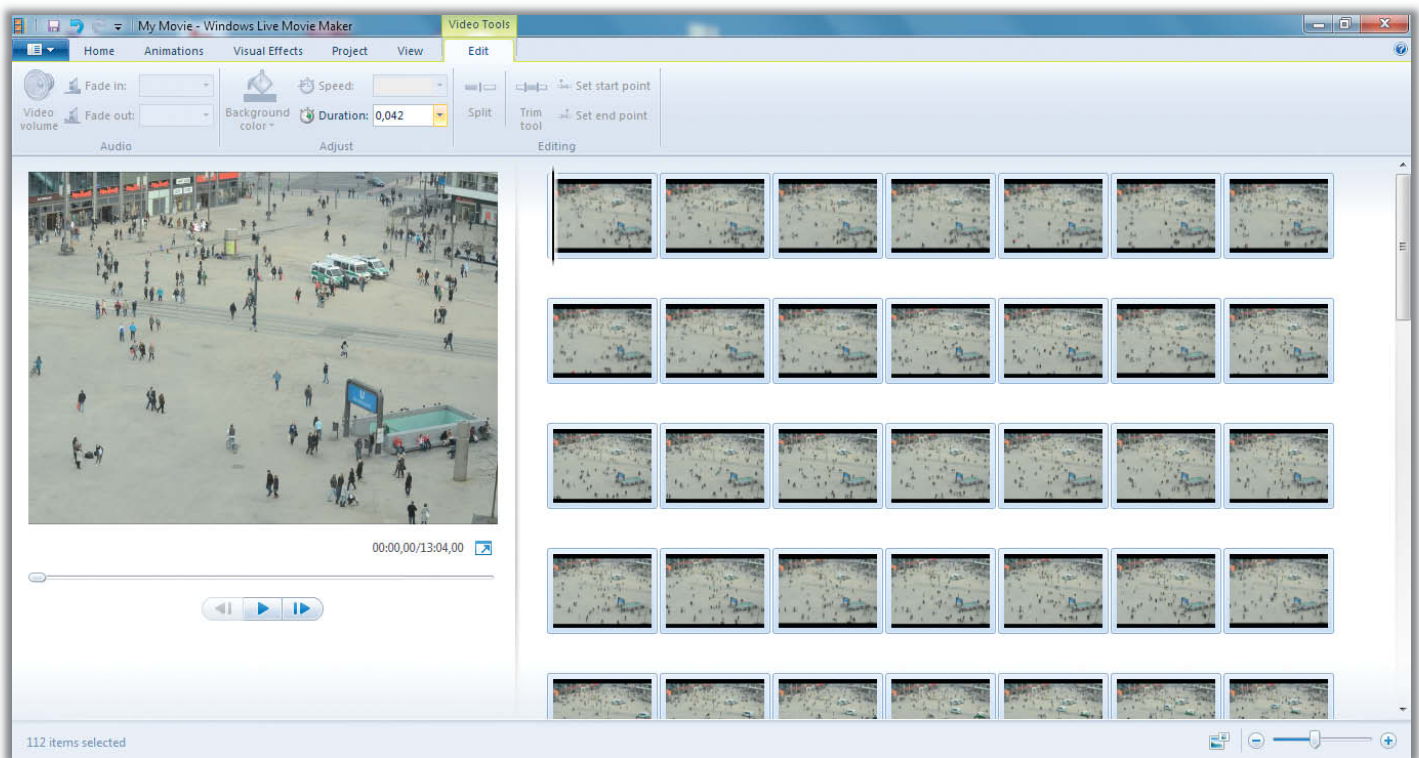
most Nikon DSLRs, which has a resolution of 2464×1632 pixels. The smaller the image size, the greater the number of images that fit onto the memory card. Depending on the length of your planned time-lapse film, this can be an important criterion. For example, if you take one photo every five seconds for 30 minutes,

you will suddenly have 360 image files filling up your memory card.

Selecting the Right Interval

The right exposure frequency depends on the situation. A good rule of thumb says that





Instead of image frequency, Windows *Movie Maker* requires you to select the duration of display for each image – 24 fps equates to a display duration of 0.042 seconds.

Video Creation Software

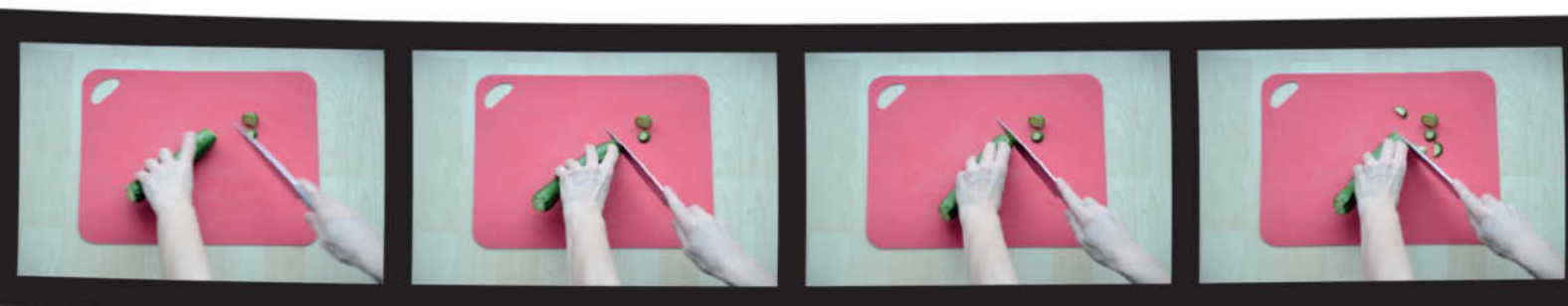
You've taken all the photos and transferred them to a computer, so now you have to turn them into a time-lapse video. The available software ranges from the utility that came free with your operating system (such as *Windows Movie Maker*), to dedicated freeware and shareware and commercial plug-ins for expensive pro-grade programs like *Photoshop* and *Premiere Pro*. Any of these will provide the necessary basic functionality – i.e., importing a series of images and exporting them as a video – but they

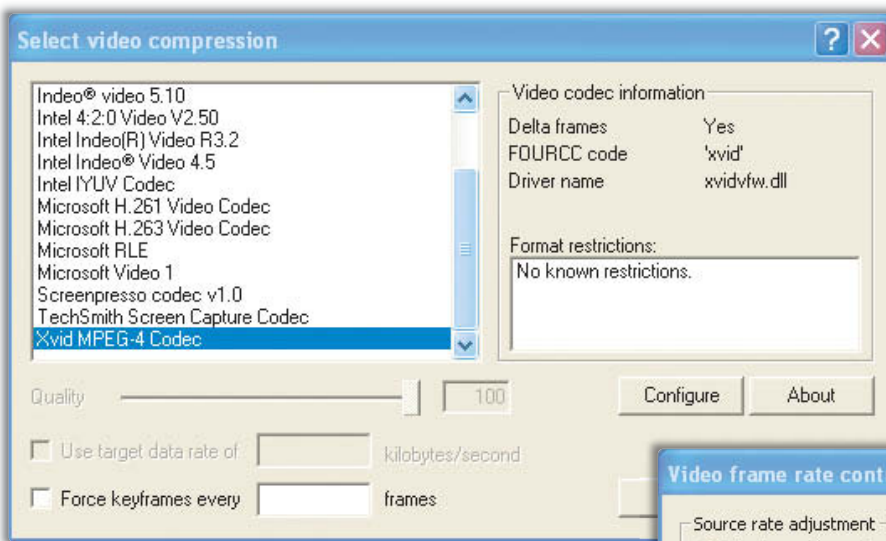
differ greatly as far as user-friendliness and flexibility are concerned.

Some programs stick to preset frame rates for video export, while others allow you more creative freedom. Video formats and compression algorithms are another thing to consider – does the software support these, and if so, how? *Movie Maker* and other programs for beginners who are not familiar with the characteristics of different file types have dedicated buttons for exporting to YouTube and other sharing sites. In *VirtualDub* and other more sophisticated applications, the availability of a specific export format

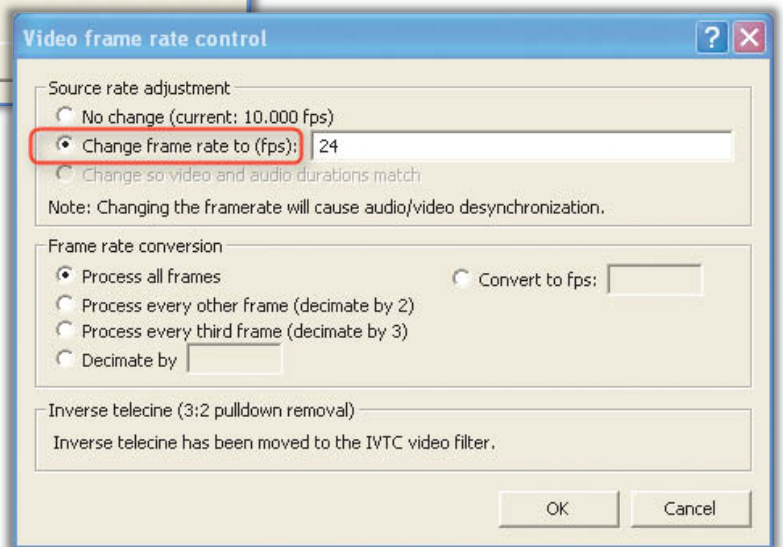
depends on whether the appropriate codec is installed as part of the operating system. Some video applications require a fair degree of know-how to be used successfully but reward the user with flexible compression settings that can be set to suit specific output devices. Appropriate codecs (DivX, Xvid, etc.) can be installed at any time and are then available for immediate use. For more information about video formats and codecs, see the box on Page 81.

In addition to basic functionality, some time-lapse software offers extra features that eliminate or speed up individual steps in the





VirtualDub supports all the codecs currently installed in the operating system, which gives you more creative freedom but requires a working knowledge of the medium



video creation process. *VirtualDub* and *Time Lapse Assembler* don't require you to customize your images in advance and instead reduce them to an appropriate size automatically during loading. *VirtualDub*, *Avidemux* and *LRTimelapse* all include options for applying various creative effects and/or preventing flicker.

Programs vary greatly in terms of user-friendliness, too. Comprehensive video processing packages like *VirtualDub* and *Avidemux* require you to put in some time learning how to operate them, whereas *Movie Maker* takes new users step by step through the process of creating a video.

For your first few time-lapse projects, try using free or pre-installed programs that don't require a lot of training. For Windows users, that means *Movie Maker*, which is located in the Accessories > Entertainment Media folder for versions up to and including Vista. The program is known as *Live Movie Maker* in Windows 7 and is part of

Programs like *VirtualDub* allow the user to enter a custom frame rate when making a video

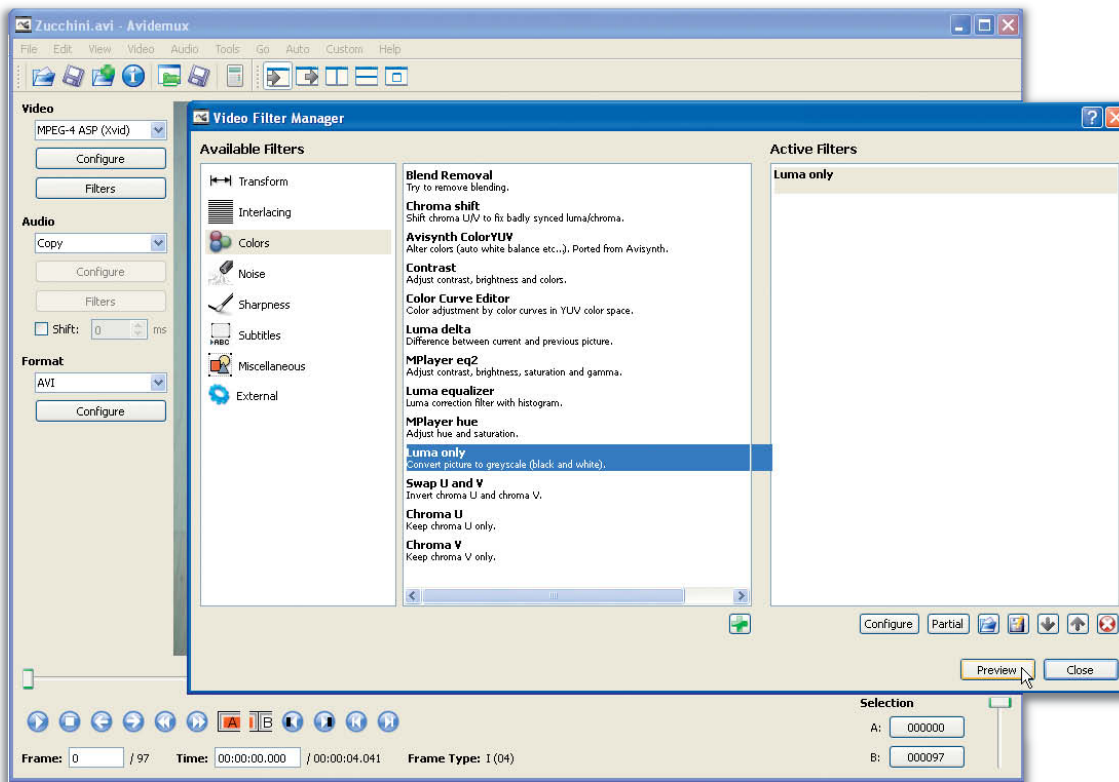
the *Live Essentials* package that can be downloaded from the Microsoft website. For Mac users, using *QuickTime Pro* (US\$29.99) is the easiest way to produce time-lapse movies. The program is also available for PCs at the same price.

A cheaper alternative for Mac users is the *TimeLapse Assembler* donationware. If you think you'll be doing a lot of time-lapse

photography and want to get to know the different programs better, try *VirtualDub* (Windows freeware) or *Avidemux* (multi-platform freeware). *FFmpeg*, *MEncoder* and *Stopmotion* are all good choices for the Linux environment.

When looking for an easy entry into the world of time-lapse video creation, it's worth checking out the additional functionality of





Creative image processing does not necessarily have to be a separate step that you perform before the video is actually made. Programs such as *Avidemux* offer a wide range of filters and effects that you can apply during video generation.

the software you already have on your computer. *Photoshop* (from *CS3 Extended* onward) includes easy-to-use sequence-building functionality, and *Lightroom* also works well once you have installed downloadable templates for video export and reducing the display duration in the slideshow module (see the *LRTimelapse* section on the next page). Finally, you can also use specialized programs like Adobe *After Effects* or video editing programs like *Premiere*, *Premiere Elements* or *Final Cut* to create time-lapse films. However, these are expensive, sophisticated software packages and it would be over the top to buy one purely for the sake of its time-lapse functionality.

Assembling a Video

Depending on the image format, the number of source images and the video creation program you have chosen, it may be worthwhile copying the images into a separate folder and downsizing them before doing anything else. This uses less memory and speeds up your work later on, especially if you have a large number of large-format images. You can now begin selecting your images. There are two ways to go about this: either select and import all images (as in *Movie Maker*) or, in *QuickTime Pro* and *Photoshop*, simply select the first image and check the *Image Sequence* option. *VirtualDub* requires you to use the 'Open a video file' command in

the File menu, which is anything but self-explanatory. Then, before you go any further, some programs also require you to drag your images to the timeline.

All that's usually left to do is to define the frame rate. In *QuickTime*, you can enter any number you like, while other programs use preset frame rates. If you have a choice, it's best to start with the cinema frame rate of 24fps. Once you have gained some experience, you can tinker with your frame rates – try 30, or 16 (the rate used in silent movies) and try to get a feel for the way different rates affect the look of the finished video. Movements start to become fluid at between 14 and 16fps. At slower speeds, movements are generally too jerky for comfortable viewing.



TIME-LAPSE PHOTOGRAPHY TOOLS							
	Avidemux	FFmpeg	LRTimelapse	QuickTime Pro	Time Lapse Assembler	VirtualDub	Windows Movie Maker
Manufacturer/Developer	Mean	The FFmpeg Project	Gunther Wegner	Apple	Daniel Bridges	Avery Lee	Microsoft
URL	http://avidemux.org	www.ffmpeg.org	http://lrtimelapse.com	www.apple.com/quicktime	www.dayofthenewdan.com/projects/time-lapse-assembler-1	www.virtualdub.org	http://explore.live.com/windows-live-movie-maker
Operating System	Linux, Mac, Windows	Linux, Mac, Windows	Mac, Windows	Mac, Windows	Mac	Windows	Windows
Category	Video editing/conversion	Video editing/conversion	Time-lapse tool, standalone image editing, videos using Lightroom template or other tool	Video editing/conversion	Tool for time-lapse videos	Video editing/conversion	Basic video creation/editing
Frame Rate	Freely selectable	Freely selectable, depending on codec	15, 24, 25, 30 fps	Freely selectable	Freely selectable	Freely selectable	Display time per image freely selectable
Image Editing Effects	Downsizing; numerous filters, e.g. color effects	Downsizing	Cropping; deflicker and alignment directly in LRTimelapse. Extensive further editing in Lightroom.	Extensive video post-processing possible	Downsizing	Downsizing; numerous filters, e.g. color effects; more filters can be installed	Downsizing via output formats
Other	Wide range of video formats	Command-line program	Best used with Lightroom or other programs that support Adobe Camera Raw	None	None	Filters (MSU Deflicker and Graft Deflicker) available	Includes wizard for video creation
Price	Free (GNU GPL)	Free (GNU GPL)	Donation	US\$45	Donation	Free (GNU GPL)	Free

Each program sets the frame rate differently. Some allow you to enter a value directly, while others use amount of time each image is displayed as their starting point. In the previous (Vista) version of *Movie Maker*, the frame rate is set in the Advanced tab of the Tools > Options menu. In the newer Windows Live version, the Duration setting is hidden in the Edit menu. Converting a frame rate a duration value is simple: a frame rate of 24fps corresponds to 1/24s, or 0.042 seconds per image (see the illustration on page 76).

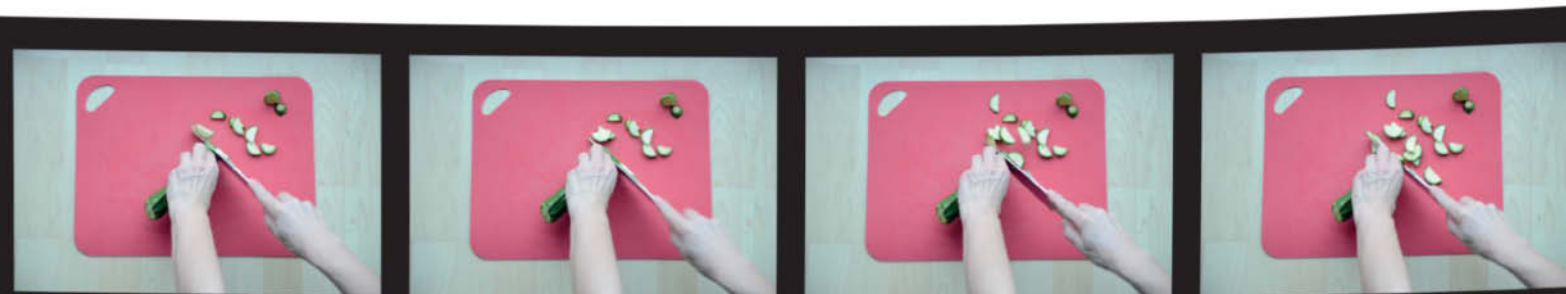
No further settings are required and all you have to do now is export your sequence as a video. It is usually possible to select the file format and compression algorithm, which determines file size and output quality. Output is very easy with *Live Movie Maker*, which provides one-click buttons for direct export to everything from YouTube to DVD. In the earlier versions of *Movie Maker*, wizards guide you through the output process.

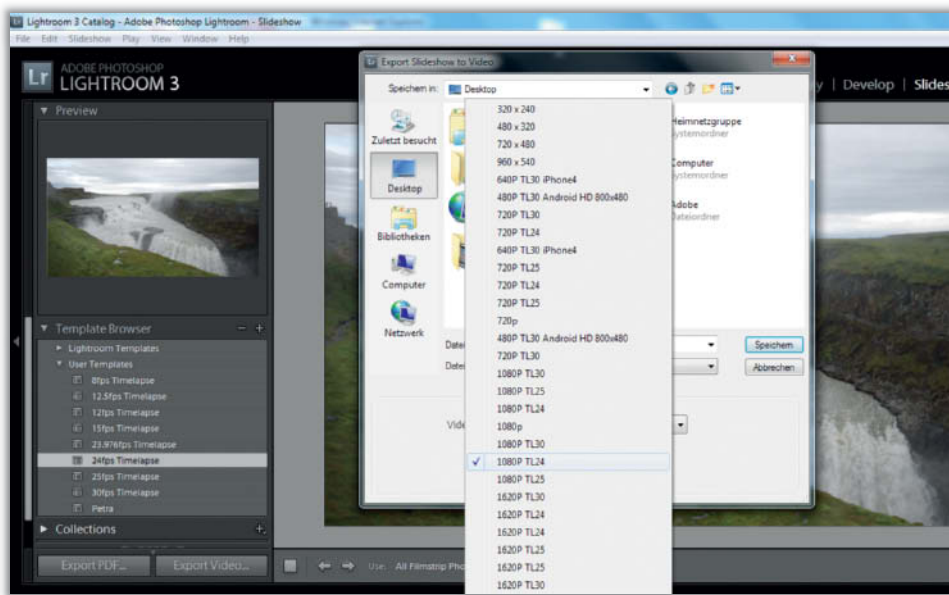
Using LRTimelapse to Perfect your Videos

While *Movie Maker* and *Time Lapse Assembler* make it easy to produce your first time-lapse video, the results may not always be as good as you had hoped. Videos often flicker, even if you couldn't tell from looking at your source images that this might be the case. This is usually because the tolerances in digital exposure systems allow for slight discrepancies between shots. Some flicker can be prevented by using manual exposure settings, but this doesn't always cover all eventualities. Specialized software, such as the *MSU Deflicker* and *Graft Deflicker* plug-ins for *VirtualDub*, can help you process the images so that the transitions are less obvious. An alternative for *Lightroom* and *Photoshop* users is Gunther Wegner's *LRTimelapse* donationware (lrtimelapse.com).

LRTimelapse reduces flicker by smoothing the transitions between one exposure and the next, using a moving average of brightness fluctuations to calculate the necessary corrections. This ensures that slow changes, such as those caused by moving clouds, are preserved, while unattractive flicker is removed. *LRTimelapse* only alters image metadata and leaves the original image data untouched. It uses the *Adobe Camera Raw (ACR)* RAW development module, which writes all the development settings – including exposure, white balance and even cropping – to the metadata of JPEG and RAW files. The modified metadata can then be read by editing software like *Lightroom* or *Photoshop*, which automatically applies the new metadata settings to the image files.

LRTimelapse is always used in conjunction with another image editing program and the following sections describe the process as it takes place in *Lightroom*.



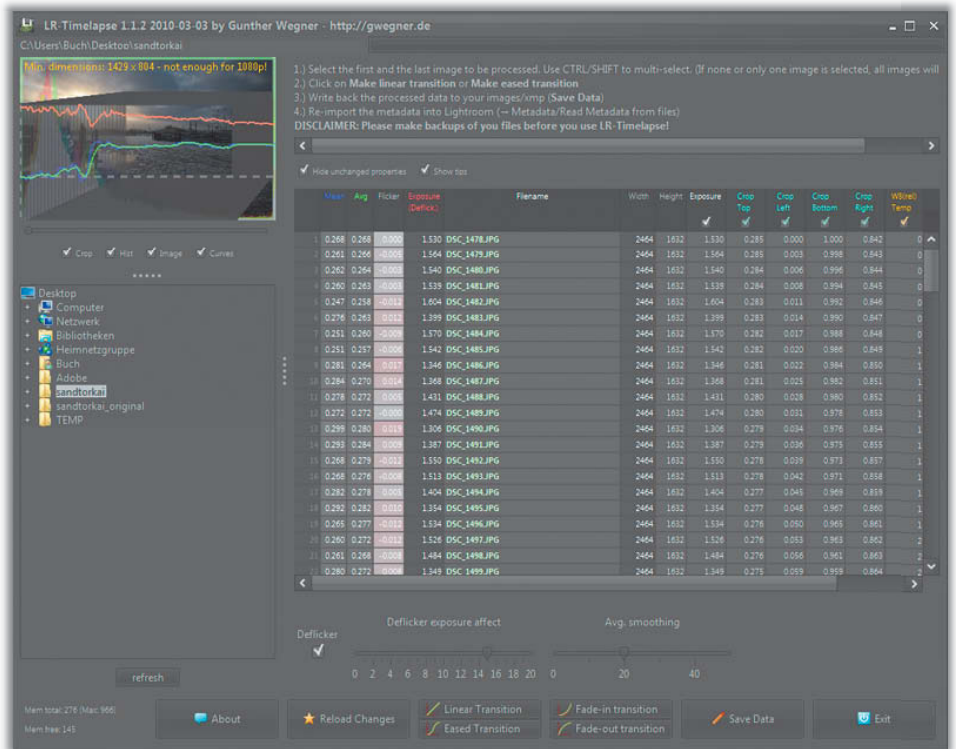


Adding video export and additional slideshow templates transforms *Lightroom* into an excellent time-lapse film creation application

LRTimelapse is designed to smooth transitions and eliminate flicker in time-lapse image sequences

The process begins by editing the first image in the sequence so that it looks the way you want it to in the final film. Next, synchronize all of your images to the first image and edit the final image to your liking. Make sure you activate the *Save Metadata To File* option in the Catalog Settings dialog.

LRTimelapse then leaps into action with its twin-slider deflicker tool. The program's developer recommends adjusting the smoothing of the reference curve manually using the Average Smoothing slider while leaving the Exposure Effect slider at its default value. It is even possible to set a reference detail to make the corrections more balanced. There are also buttons for S-shaped, Fade In and Fade Out transitions. These are not particularly



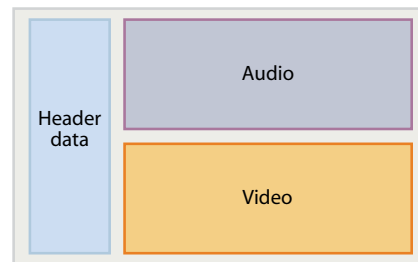
A Beginner's Guide to Video Formats and Codecs

The digital storage of sound and video data involves a compression process that produces the smallest possible file size while keeping image quality loss at an acceptable level. The algorithm required is part of the operating system and is known as a 'codec'. Codecs are usually available to all programs, although some proprietary codecs, such as the *RealPlayer* and *QuickTime* ones are installed exclusively with the corresponding software. The process of creating a new video file is known as 'encoding', and when you play a file, your software 'decodes' it in real time.

MP3, WMA and Ogg Vorbis are all well-known audio codecs with filename extensions that are obviously related to their names. Video codecs are a little more confusing, and while it is true that MPEG (Moving Picture Experts Group) file formats dominate the video world, there are many different variants from various manufacturers on the market. For example,

the MPEG-4 category includes the popular Xvid open source format as well as DivX, Nero Digital and many other formats. Furthermore, the file name does not necessarily reveal which codec was used, because the data is stored in a container

Container Format



Container files can use different compression algorithms for audio and video files. The relevant information is stored in the header.

file, which could have the .avi (Windows) or the .mov (Apple) extension. All that an extension tells you is that the file is a video file. A container usually contains a header that includes all the relevant details and separate audio, video (and sometimes subtitle) data. This structure means that audio and video files can be compressed using different algorithms. For example, An .avi file can contain MP3 audio data and DivX video.

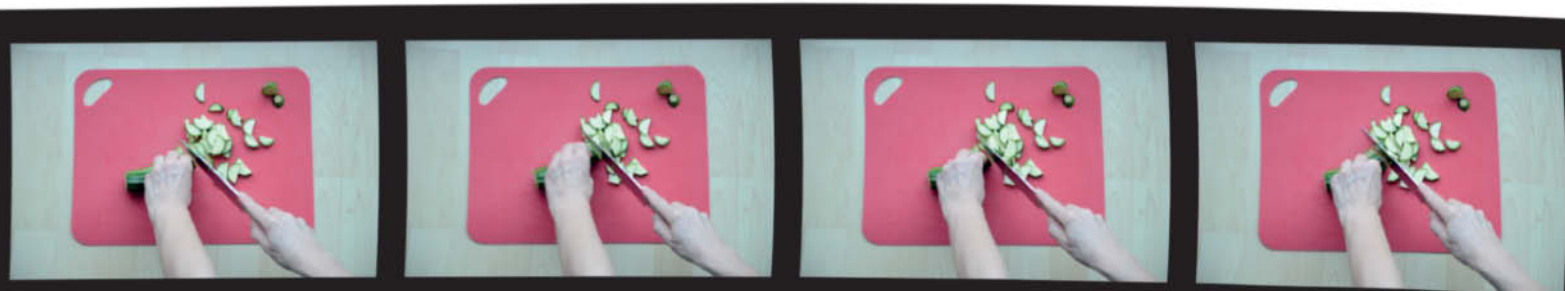
There is no simple answer to the question of the 'best' codec to use for a video file. The one you use will depend on the purpose of the file and the output device you use to view it. MPEG-2 is the best format to use for burning files to DVD, whereas an HD-compatible codec like H.264 is better if you want to display your footage on an HD TV. If your material is destined for viewing on the Internet, a browser-friendly format such as Flash (.flv) is a better choice.

relevant to the deflicker process but can be useful for jazzing up your video with creative effects if you wish. Unfortunately, due to its metadata-based correction methods, the program doesn't let you preview your changes. Use the Save Data button to apply the new parameters to all your images. Then, back in Lightroom, you can use the Metadata > Read Metadata From File command to import the changes. That completes the image editing part of the process and you can now load your images into one of the video creation programs mentioned earlier.

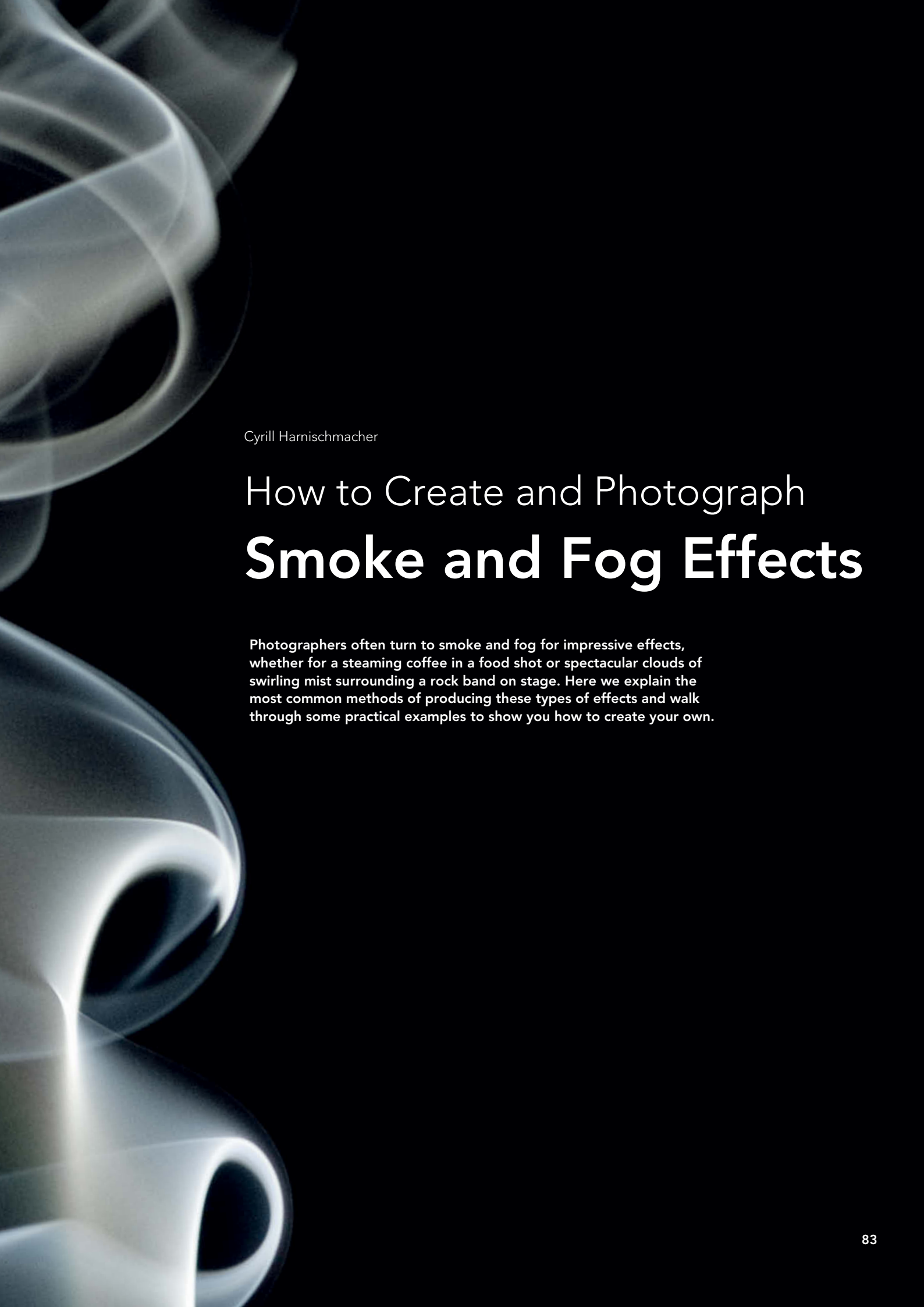
Alternatively, you can use the *Lightroom* Slideshow module to play your film. Unfortunately, the program's fastest standard frame rate is 10fps, which is not really fast enough for most time-lapse films. Gunther Wegner has programmed free additional templates that increase the display rate to 24, 25 or 30 fps.

Wegner also supplies video export templates with different sizes, bit rates and display refresh rates for *Lightroom 3* and *4*. These turn *Lightroom* into an easy-to-use, full-featured time-lapse video creation program.

LRTimelapse also enables you to produce smooth white balance transitions and virtual pans using the Ken Burns Effect (i.e., by constantly changing the detail being displayed). It is worth using the program for this feature alone, as it is much easier to create pans from cropped images than it is to perform them smoothly during shooting. If you shoot high-resolution source images, you will have plenty of processing leeway and you will be able to produce results of a better quality than you can when using the zoom feature in a video editing program. (jub) **ct**







Cyrill Harnischmacher

How to Create and Photograph Smoke and Fog Effects

Photographers often turn to smoke and fog for impressive effects, whether for a steaming coffee in a food shot or spectacular clouds of swirling mist surrounding a rock band on stage. Here we explain the most common methods of producing these types of effects and walk through some practical examples to show you how to create your own.

Creating Smoke and Steam

The difference between smoke and steam is easily explained: smoke consists primarily of the products of combustion, i.e., solid particles, whereas steam consists of very fine droplets of liquid. In either case, the tiny particles reflect light as it strikes them, and thus become visible.

There are several ways of creating smoke or steam in the studio, but not every kind of smoke or steam is equally suitable for all purposes. The amount produced and the intensity vary greatly, as do the appearance, behavior and length of time that the effect lasts. The best method to use will depend on the subject and the effect you want to create. Chance affects the results too, so you will usually have to take a series of photos in order to achieve the desired result.

Fog Machines and Hazers

The classic stage prop that we are all familiar with from discos and parties is the fog machine, which works by vaporizing a special 'fog fluid'. Even small machines have a relatively powerful output, which makes them unsuitable for low-key effects like a steaming cup of coffee. They are more suited to large-scale applications, such as producing fog for a stage or filling a whole room. The effects can be very impressive, especially if you shoot using colored flash.

You can pick up a fog machine quite cheaply online or from events suppliers and music stores.

Hazers are a special type of fog machine that create a fine haze rather than thick fog.

They are used in stage shows to fill the entire stage area with haze so as to make the beams of light from the stage lighting visible. You can achieve a similar effect in a home studio by using a fog machine and blowing the fog around to fill the space.

Dry Ice

If you want your fog to really billow, dry ice is your best bet, although can be difficult to obtain and store. Dry ice is actually carbon dioxide (CO₂). At -78.5 degrees Celsius, it changes from a solid state directly into a gas. The CO₂ gas thus created is heavier than air and sinks to the ground.

Dry ice is particularly useful in situations that require the fog to remain close to the subject, or you want to use it in a targeted fashion to cover a small area. Since this type of fog sinks, it does not work too well to simulate hot food, but is great if you are photographing themes such as a chemistry lab or fantasy scenes.

Dry ice comes in the form of pellets or blocks. Because it has to be kept frozen at extremely low temperatures, it cannot be stored for long, and you can only keep it for two to three days before it literally vanishes into thin air. Consult your local telephone directory to find a supplier. You can also buy dry ice online, but bear in mind that if you order five kilos with a two-day delivery schedule, you will end up with only about two kilos of product.

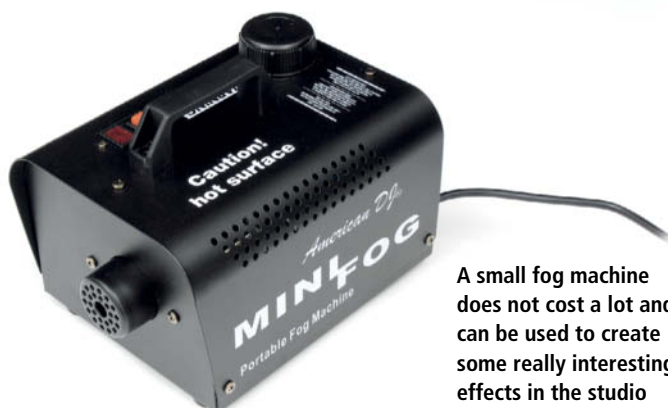
If you plan to use dry ice, read the safety instructions very carefully and wear appropriate protective equipment, including gloves and safety glasses.

To make fog, pick up a few clumps of dry ice with a spoon and put them into a



Here, the fog machine was placed behind the metal screen and activated just once, shortly before the exposure

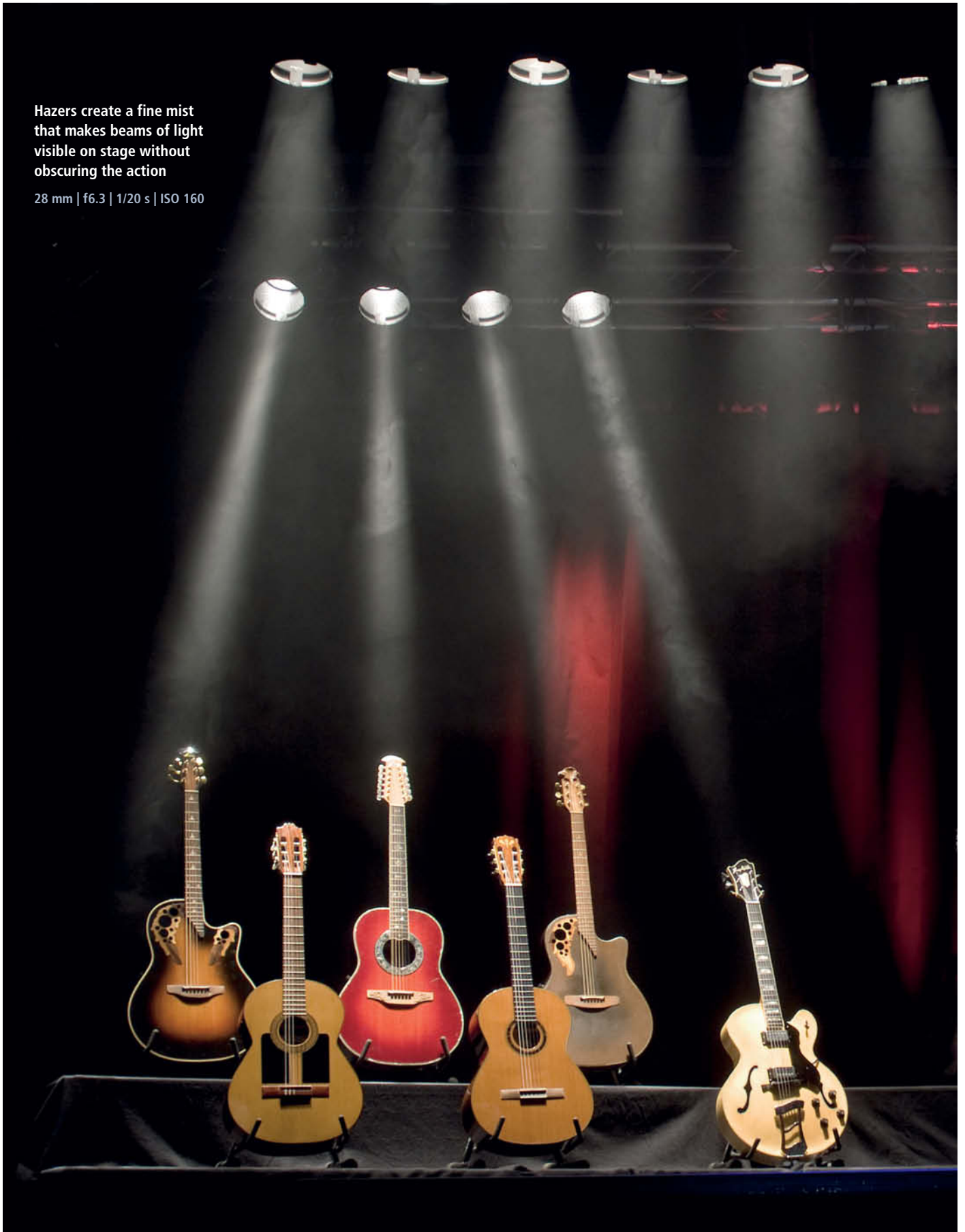
60 mm | f16 | 1/200 s | ISO 100



A small fog machine does not cost a lot and can be used to create some really interesting effects in the studio

Hazers create a fine mist that makes beams of light visible on stage without obscuring the action

28 mm | f6.3 | 1/20 s | ISO 160





Just add a little dry
ice to water tinted
with food coloring
and hey presto – you
have a delicious
witches' brew

60 mm | f18 | 1/160 s |
ISO 100

container, then pour some warm water over them. Alternatively, add a lump of dry ice to some warm water – the effect is the same.

Smoke Tablets

No, we're not talking about products to help you give up smoking, but rather about a commonly used method of detecting cracks in industrial buildings. Smoke tablets are also used to create spectacular vapor trails at model airplane shows. Most tablets burn for up to two minutes and produce about four cubic meters of smoke, making them unsuitable for studio photography. They are better kept for outdoor use – for example, when photographing musicians.

Be careful if you are using large-scale effects, as some types of smoke or artificial fog will trigger any nearby smoke alarms! It's a good idea to let neighbors know what you are doing before you start a shoot, not only to prevent undue concern, but also to avoid the fire brigade getting called out on a false alarm.

Tobacco and Incense Sticks

Burning a little tobacco in a tea light holder is a great way of generating small amounts of targeted smoke. The smoke rises quickly, creating a thin plume of smoke that is not particularly suitable for creating large-scale effects but is ideal for enhancing small details. If you don't like the smell of tobacco smoke, try incense sticks or cones instead. Tobacco often has a slight blue cast, but this is easily removed later during processing, usually by reducing saturation.

Vapor Effect

Photographic accessory stores stock a two-component product that is often used in food and still life photography. The chemical



Tobacco, model railway 'smoke oil' and incense cones or sticks are all you need to produce a range of tabletop smoke effects

reaction that occurs when you mix the two liquids produces very photogenic plumes of vapor. The liquids can be used in very precise quantities and here too, it is important to observe the manufacturer's safety instructions.

Smoke Generators

Model railway enthusiasts use tiny smoke generators to simulate the steam from a locomotive. This is done by filling the generator with 'smoke oil' and heating it with

an electric coil. In photo studios, these generators come in very handy for producing small amounts of smoke in just the right place.

Steam

In food photography, a popular way of simulating the heat of hot food is to use water vapor – hardly surprisingly, since that is exactly what does waft up from a bowl of hot soup! What is tricky, however, is getting water vapor to stay in the right place at exactly the right time.

SMOKE AND STEAM GENERATORS

	Description and uses	Source	Price	Notes
Hazers	Wide-area haze on stage or in a photo studio	Music retailers, event suppliers	From US\$75	–
Fog machines	Wide-area smoke on stage or in a photo studio. Sometimes also for tabletop use.	Music retailers, event suppliers	From US\$40	–
Incense sticks/cones	Targeted smoke for tabletop and food photography	Fair Trade shops, Christmas markets, etc.	From US\$1	–
Smoke generators	Targeted fine smoke produced using 'smoke oil'	Modelmaking shops	From US\$30	Age restrictions may apply
Smoke oil	Targeted fine smoke produced using smoke generators	Modelmaking shops	From US\$10	Age restrictions may apply
Smoke tablets	Intense smoke effects for outdoor use when large amounts are required. Also available colored.	Specialist pyrotechnics stockists	From US\$15	Age restrictions apply
Tobacco	Targeted smoke for tabletop and food photography	Tobacconists	About US\$10	Age restrictions apply
Dry ice	Fog that sinks to the ground for partial and wide-area fog effects	Specialist suppliers, consult directory	From about US\$45	Note safety instructions. Limited storage period.
Vapor effect	Targeted smoke for tabletop photography	Specialist pyrotechnics stockists, photography accessories retailers	About US\$40	Liquids can be corrosive
Steam	Fine, delicate steam, ideal for simulating hot food. Effect does not last long.	Available in any home	–	Very cheap but not very intense

Practical Applications

Smoke and steam only become fully visible when illuminated using flash. The best results are achieved using targeted lateral light and as dark a background as possible. White smoke against a white background is obviously not the best setup. If a dark background is not possible for whatever reason, try to position darker parts of your subject so that the smoke or steam rises in front of them and therefore remains visible.

Pure Smoke

Let's concentrate for a while on appreciating the inherent beauty of smoke. The fascinating shapes that come from a candle immediately

after it has been extinguished are worth looking at more closely. The smoke is swirled about as the warm air rises and the air around it moves, forming new, unpredictable patterns. Sometimes it rises in a fine, thin thread and sometimes as a sumptuous 'bloom'. Often the shapes seem to be regular or symmetrical, but then, in the twinkling of an eye, they disappear. Like snowflakes, smoke patterns are unique.

The methods described below can be applied to just about any photographic project that uses smoke or steam.

All you need is a candle or a few incense sticks, an accessory flash, two pieces of black card, a black background and a darkened room. A normal accessory flash set to ¼ power

will provide sufficient light to shoot at ISO 100 and f8.

The black card is used to shape the beam of light into a thin strip. This way, the background stays truly black and no stray light reaches the lens. The 'hard' lateral light this creates is ideally suited to photographing smoke. The flash is fired either using a sync cord or a remote trigger.

First, mount the camera on a stable tripod, then pre-focus on the subject – in our case, the candle. The constantly changing contrast will confuse autofocus, so keep it switched off. Set your camera to manual exposure mode.

Set the exposure time to match the flash sync speed quoted by your camera's manufacturer and take a few test shots at f8 to



Corkscrew
60 mm | f7 | 1/50 s | ISO 100, reduced saturation



'X-ray'
60 mm | f7 | 1/50 s | ISO 100, reduced saturation

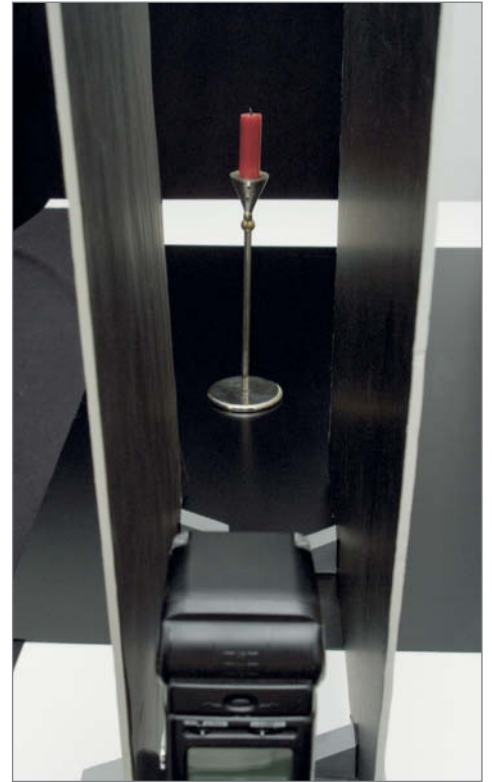
check whether the images are properly lit or whether you need to increase flash output.

The most spectacular smoke trails are created at the moment the candle flame is blown out and the wick is still glowing, or, in the case of a cigarette or an incense stick, when the flame goes out after you have lit it. Using a remote release eliminates the need to rush back to the camera after extinguishing the flame and helps you concentrate on capturing the best smoke trails.

Smoke reacts to even the tiniest air movements and you can exploit this to create amazing shapes – but take care to block drafts and avoid making quick movements as these cause the air around the subject to eddy and spoil the natural shapes. With practice, you'll develop a feel for how to move your hand back and forth to make different smoke designs. Another interesting variation is to use sudden small movements to make incense sticks produce smoke rings.

You don't always need studio flash. Here, two pieces of black card shape were used to shape the light beam from a single accessory flash.

This is the time to let your imagination and instinct for play run wild. Interpreting the shapes of the results and seeing what shape they are, finding faces in them and giving them names can be a lot of fun. In the photos below, the two on the left were created using a candle and the ones on the right using an incense cone.



Statue of Liberty torch
60 mm | f7 | 1/50 s | ISO 100



Lady in evening gown
60 mm | f7 | 1/50 s | ISO 100



Ionic column
60 mm | f7 | 1/50 s | ISO 100



A beauty dish with a honeycomb filter produces 'hard' lateral light. Two pieces of black card were used to shape the light beam and prevent any stray light from spoiling the overall effect.



A burning cigarette stub is hidden in the barrel of a pistol. Non-smokers may prefer to use incense sticks or cones.



Smoking Pistol

In this example, we used burning tobacco to produce the smoke. We set up the composition, lighting and props so that the lantern's flame was reflected in the knife blade. After several trial runs and several checks on the monitor, we set up the version with the smoke using tweezers to carefully place a burning cigarette stub into the barrel



of the pistol. The key to composing this image was allowing enough space for the smoke to act as a central visual element.

We used a beauty dish with a honeycomb filter to produce targeted lateral light that helped the smoke to show up against the black background as a thin, contoured trail. To prevent stray light from spoiling the scene, we

used black card to shape our light source. Instead of using the manufacturer's recommended flash sync speed, we used a longer ($\frac{1}{4}$ s) exposure so that the warm light from the lantern could create a golden glow. In a situation like this, the room has to be almost completely dark to prevent ambient light from spoiling the mood of the shot.

Here, instead of using the standard flash sync speed, we used a long exposure of $\frac{1}{4}$ s to allow the warm light of the lantern to emphasize the mood of the scene. We then used an additional flash to 'freeze' the movement of the smoke trail

40 mm | f13 | $\frac{1}{4}$ s | ISO 100

Hot Coffee

Here too, we used tobacco, this time to simulate the steam coming off a hot coffee. Strictly speaking, we should have used real steam from hot water, but this cannot be positioned as precisely and does not produce as intense a result. To make the tobacco smoke

look more like steam, we used an accessory flash with a strip-light to produce targeted but soft light. This makes the steam from the coffee look a little softer and makes it spread out a little more than the smoke from our flintlock pistol. A second accessory flash with

a red filter was placed beneath the subject to produce the color gradient on the black background.

To make the coffee cup appear to float, we fixed it to a metal bracket using hot-melt adhesive. This type of glue hardens very



quickly and is easy to remove from most materials. In our example, we used several small blobs of glue to fix the cup in place for some test shots, before applying large amounts of glue to keep the setup stable while we shot the final version of the photo.

We painted the bracket with matte black acrylic paint to keep it from reflecting in the shiny saucer. During post-processing, we also removed a few final reflections and used the Dodge tool to emphasize the smoke a little.

The 'coffee' emphasizes the movement of the cup, and is actually made of shiny black foil set at a slight angle and fixed in place with a few drops of glue. A piece of burning cigarette was dropped into the cup through the opening at the side just before the shot was taken so that the smoke from the cigarette wafted up like steam from a hot cup of coffee.

Smoke and steam show up particularly well against dark backgrounds

50 mm, f6.7, 1/180 s, ISO 160



Image Processing

Most of our images looked really good straight from the camera, but a little post-processing in *Photoshop* can always make them even better. We duplicated the original background layer and switched the new layer's blending mode from Normal to Screen. The intensity of the smoke trail can then be intensified by altering the layer's opacity.

Partial corrections can be made using the Dodge tool with its Highlights setting. With tobacco and incense smoke, it is often necessary to prevent color casts by reducing saturation using the Sponge tool.

After a while, you will build up a 'smoke archive' that you can use to add smoke effects to other images.

To do this, select an appropriate smoke shot, place it on a new layer above the background layer and switch the blending mode to Screen. You can now position the smoke trail anywhere you like. The only prerequisite for producing seamless smoke montages is that the smoke itself is photographed in front of a completely black background.

Hot Soup

This is another shot for which it is really important to get everything (especially the lighting) set up correctly before starting to shoot. In order to prevent the ingredients from sinking to the bottom of the soup, we built the it up layer by layer from the bottom.

The first step was to mix some of the soup with a couple of packets of gelatin and pour it into the bowl. We filled the bowl just enough so that we could see the soup through the viewfinder. This layer then served as a base for the rest of our soup model. Placing the gelatin soup in the refrigerator accelerated the cooling process, and we placed a saucer

over the bowl to prevent dust from settling into the liquid.

Once our gelatin layer was set, we soaked the noodles in hot water for about 10 minutes and, once they had cooled, arranged them with the vegetables, mushrooms and herbs on top of the gelatin base. We then added a ladle of (still runny) soup until the ingredients were two-thirds covered with liquid.

The next step involved boiling a large potato, which served as our source of steam. We placed the potato behind the soup bowl where it couldn't be seen and cut it open just before we made our exposure. Steam from a

hot potato looks realistic in flash light or in long exposures but dissipates quickly, making it necessary to work fast. We used a sheet of paper to gently waft the steam toward the bowl to make it appear to rise from the soup itself.

In our example, the soup bowl was lit from the left using light from a strip-light that we shaped using black card. A second flash with a spot attachment was set up at the same height as the rising steam. We also used several small mirrors to delicately reflect the light from the flashes onto the mushrooms to the right of the bowl and we used a piece of white card



The ingredients look totally natural suspended in gelatin and do not sink to the bottom of the bowl. Since virtually no liquid is visible in the final image, no-one will notice that the soup is a little too grainy. Perfectionists can always filter the soup and use a brush to paint some soap-based foam around the edges of the bowl.

The hot potato was positioned directly behind the bowl to prevent it from appearing in the final image

positioned to the right to highlight the shape of the bowl.

Instead of a potato, you can use a bowl of hot water to produce a similar effect. If you have space, you can also use a small hotplate and a saucepan of water, which will provide a steady supply of steam for much longer.

Steam is just as unpredictable as smoke and fog and you will need to spend quite a bit of time experimenting until you come up with the best way to arrange the subject, background, lighting and smoke source to produce the effect you are

looking for. Always take as many shots as possible so you can select the best when you are done.

Perseverance during a shoot will be rewarded not just with a learning experience but also with spectacular photos. Even used sparingly, steam and smoke are powerful visual signals and immediately trigger any number of associations in the viewer's mind.

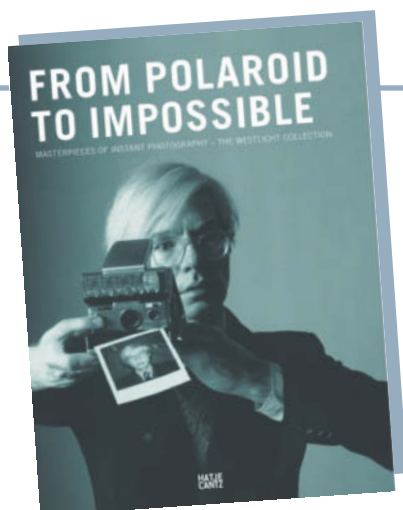
The result is exactly what the photographer intended: a single image that tells a whole story. (anm) **ct**

Most of the steam from the potato lies outside the very limited area of focus. We wafted it forward using a sheet of paper to ensure that it appeared above and not just behind the bowl.

60 mm | f6.3 | 1/200 s | ISO 200



Photo Book Reviews



From Polaroid To Impossible

Achim Heine (Editor),
Ulrike Willingmann (Editor)
Text by Barbara P. Hitchcock
Published by Hatje Cantz
192 pages
230 color illustrations, 25×32 cm
US\$60
ISBN 978-3-7757-3221-5

Two hundred and thirty of these photos have now been immortalized in this wonderful book, which catalogs an exhibition that took place at the Westlicht photographic museum in Vienna in the summer of 2010. This selection covers a period of more than 50 years of photographic history and spans just about every genre. Due to the nature of the Polaroid instant photo medium, all of these photos are unique originals, and reproducing them in this way – complete with their borders and traces of the chemical processes that formed them – is the logical way to pay tribute to their importance. The hand-written notes made by some of the photographers give the photos added appeal.

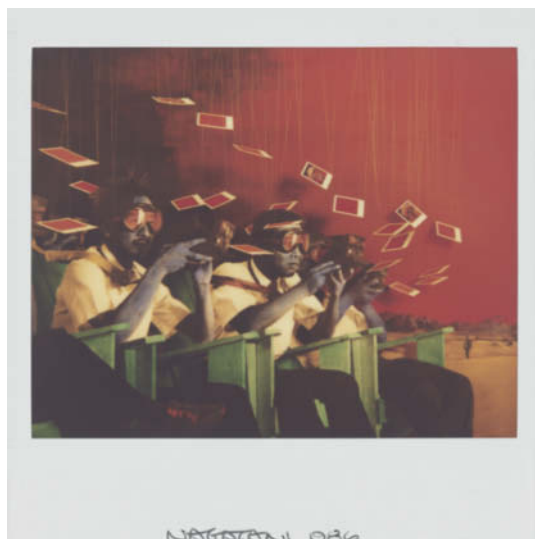
As well as documenting bygone instant photo art, *From Polaroid to Impossible* provides a history of recent efforts to revive a format that has often been written off due to the complete non-availability of film. The title of the book hints at the 'Impossible Project' launched by Austrian Florian Kaps that saved the last remaining Polaroid film factory from demolition. Film production was restarted there in 2010. The book also includes recent works created using the new film, testifying to the great response the rebirth generated within the photographic world. Could it be that analog photography will end up living longest in the unique and unpredictable world of the instant photo?

Saved by the Bell! From Polaroid To Impossible

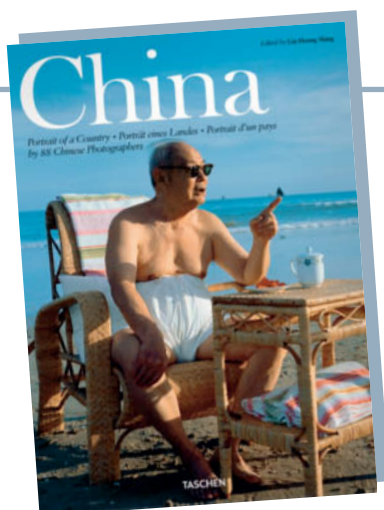
The rise of affordable digital imaging technology has been the downfall of many traditional photo companies. One of the best known of these is the Polaroid Corporation – once one of the driving forces of the photographic industry. The sale of much of the company and impending bankruptcy have brought the Polaroid brand to the brink of extinction, not only affecting thousands of employees, but also threatening the existence of a unique collection of photos.

The Polaroid Collection's global reputation was based on works by many of the all-time greats, including Ansel Adams, Robert Mapplethorpe, Helmut Newton, Gunter Sachs and Andy Warhol, and the outcry was huge when it was announced in the summer of 2010 that the collection was to be auctioned off. Large parts of the collection are now privately owned and only a batch of 4,400 originals that had previously been loaned to the Musée Elysée in Lausanne was saved in its entirety.

From Polaroid To Impossible presents these unique images complete with borders, traces of chemicals and hand-written notes



Photos courtesy of Hatje Cantz



China, Portrait of a Country

Heung Shing Liu (Editor)
 Published by Taschen
 424 pages
 25 × 34 cm
 US\$29.99
 ISBN: 978-3-8365-3089-7

doesn't make value judgments – or at least, not unless you consider such a welter of photos depicting violence to be a judgment in themselves. But this book is not only about violence, and peaceful moments from the lives of the people in the street (and their masters) are just as much a part of the visual feast on offer.

Heung dedicates 120 pages to the great leap into the capitalist present, and this is where his personal feelings and motivations are clearest. The images in this section include portrayals of agitative art and the Potala Palace in Tibet, flanked by a quote from the Dalai Lama.

The map of China included in the appendix shows no border between Tibet and the rest of the country – a detail that is surprising to Western eyes in an otherwise persuasive masterpiece available at a price that makes it a real gift. (Robert Seetzen/rst)

A Masterpiece at a Bargain Price: China, Portrait of a Country

Heung Shing Liu searched through the archives of 88 Chinese photographers to create this fantastic collection of images of historical moments and everyday events. The result is a big, 424-page book that documents the history of China since 1949. The volume's subtitle, *Portrait Of A Country*, indicates the breadth of the editor's ambition, and the resulting pictorial history covers 60 years of revolution, violence, hunger, poverty and dictatorship. Even if freedom in a Western sense is still a distant dream, modern China offers its people prosperity, irrespective of whether the questions of contemporary values and a system of government that extends beyond centralized control still remain unanswered. How can a single book hope to cover so much territory?

The book's editor, Heung Shing Liu, grew up in Hong Kong and China and studied politics and photography in the USA before spending a number of years working as a photographer for AP. Perhaps it is this combination of deep personal roots and wide-ranging experience that made this extraordinary project not just possible but also such a resounding success.

China unites powerful visuals with detailed background information without once appearing condescending. Heung Shing Liu

This portrait of China provides impressive photographic evidence of the recent upheavals in the country's history. This photo shows a 'model opera' – the artificially created successor to the traditional Peking opera.



Photo courtesy of Taschen

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Image Processing Tools

Windows

GIMP 2.6.12
 GIMP Portable 2.6.12
 GREYC's Magic Image Converter (G'MIC) 1.5.1.2
 Image Analyzer 1.34
 ImageJ 1.45
 Inkscape 0.48.3.1
 Inkscape Portable 0.48.2
 JDraw 1.1.5
 Mosaizer Pro 9.2.140
 Paint.NET 3.5.10
 Picasa 3.9.0
 PSPI 1.0.7
 ShiftN 3.6
 StylePix 1.9.2
 StylePix Portable 1.9.2

Mac OS

GIMP 2.6.11 for Leopard
 GIMP 2.6.12 for Snow Leopard, Lion
 GraphicConverter 7.6.2
 GREYC's Magic Image Converter (G'MIC) 1.5.1.2 for Leopard, Lion, Snow Leopard
 ImageJ 1.45
 Inkscape 0.48.2

Linux

GREYC's Magic Image Converter (G'MIC) 1.5.1.2
 ImageJ 1.45
 PSPI 1.0.5 for Ubuntu

Photo Tools

Windows

AmoK Exif Sorter 2.5.6
 EXIFeditor 2.2
 Exifer 2.1.5
 ExifTool 8.89
 Gallery 3.0.3
 GeoSetter 3.4.16
 GeoSetter Portable 3.4.16
 IrfanView 4.33
 IrfanView PlugIns 4.33
 IrfanView Portable 4.33
 jAlbum 10.6
 Smart Shooter 1.1.14
 XAMPP 1.7.7

Mac OS

AmoK Exif Sorter 2.5.6
 ExifTool 8.89
 Gallery 3.0.3
 jAlbum 10.6
 MacPorts 2.0.4

Rawker 2.3.4
 Smart Shooter 1.1.14
 ThumbsUp 4.5
 XAMPP 1.7.3
 Xee 2.2

Linux

AmoK Exif Sorter 2.5.6
 ExifTool 8.89
 Gallery 3.0.3
 jAlbum 10.6
 XAMPP 1.7.7

Sample Images

Color Management Test Images
 Precision Selection Sample Images

Videos

Time-lapse Photography Sample Clips
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Photographing **Interiors**



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Interior photography follows its own rules and presents the photographer with a unique set of challenges. This workshop goes into detail on how to choose a subject and effectively shoot various types of indoor scene in a variety of different lighting situations.

Choosing a Subject

The first thing you have to do is ask yourself what exactly you want to portray and how you want to utilize the interplay between the space and the objects it contains. Once you know what to look out for, it gets easier to develop effective image ideas.

Compared with selecting outdoor architectural subjects, choosing a suitable interior subject can seem a daunting task to the inexperienced. The range of easily accessible and interesting subjects is simply much narrower (see also *Know Your Rights* on page 107). Nevertheless, there is no limit to the number of ways you can photograph a room and it is not the nature of the space itself but rather the way you portray it that determines the effectiveness of the resulting image. Shot cleverly, even a bare loft or a cellar can make an interesting subject.

In the example shown below, the form of the care-worn, abandoned loft produces an unusual, almost abstract look, while the dusty chair and the light entering the space from outside accentuate the special feel of the scene.

There is a wealth of similar subjects and interesting details to be found in derelict buildings everywhere, whether an old railroad shed, a factory building or maybe even an abandoned hospital. But castles, museums, churches and concert halls, with their impressive inner spaces, make great subjects too.

Fixtures and Fittings

The structure of the building itself is rarely the main subject of an interior photo, and it is nearly always the combined effects of the building and its interior that make the photo interesting. While the interior design of public buildings is usually reduced to a functional minimum, private spaces are a different matter entirely. In this case, the objects located within a space often play a significant role in the overall composition. For example, in the image reproduced on the opening page of this article, the intense colors of the furniture, the lamps and the plants contrast strongly with the white pillars and the circular window and play an important role in the overall mood of the image.

As soon as everyday objects such as newspapers, paintings or lamps begin to attract the viewer's attention, the architecture itself recedes almost completely into the background. Because the building serves only to give the space its shape and because the



It is not the nature of the subject itself, but rather the way you portray it that determines the effectiveness of an interior photo



A room that contains very few objects and accents will produce an image with a clearly structured composition



This image of a relatively narrow room was composed according to the Golden Ratio

fixtures and fittings convey a domestic feel, images of obviously lived-in spaces can more often be found in lifestyle magazines than in architectural periodicals.

On the other hand, architectural interior shots often appear almost clinically clean and tidy. In order to effectively communicate the functionality of the design, photographers often remove all objects that don't play a specific role in emphasizing the merits of the building itself. The only objects that remain are those that offer subtle visual accents, such as the statues and the receding pattern created by the vase and the candles in the image on the previous page.

Preparing for a Shoot

Always carry a cleaning cloth for removing dust and grease when preparing a room for a shoot. Stray fingerprints on windows and

other polished or reflective surfaces are very difficult to retouch once an image has been captured, and the same is true for dust and dirt on the floor. Once your scene is 'clean', you can arrange the remaining objects to suit your purposes. Chairs that aren't quite aligned with a receding axis or tables that are not positioned parallel to a wall can cause unwanted tension in an image and quickly make a scene look cluttered rather than carefully arranged.

When arranging interior objects, you have to choose between two extremes: go the whole hog or simply leave everything as found. You either have to arrange everything perfectly or break all the rules by deliberately arranging things to be out of kilter and attract attention. For example, a photo of a dining table and chairs can be enlivened by moving a single chair slightly to face the camera. However, if you are in any doubt, leave things

tidy – a badly placed accent can spoil an interior image to a much greater degree than a nonexistent one.

Framing and Composition

Once you have chosen and arranged your subject, you will have to give some thought to the framing and composition of the image you wish to create. Although you can adjust your framing a little at the editing stage, the overall composition is basically set in stone the moment you release the shutter. You will need to consider how to produce a well-thought-out image from the interplay between the objects, shapes, edges and proportions that make up the scene you are photographing. The aim of the exercise is to capture and hold the viewer's attention with a composition that accentuates the look and feel of the scene in question. If you are



Making the transition between the interior and the world outside part of the composition adds tension to this image

successful in performing this tricky balancing act, you will have the freedom to experiment with contradictory compositional elements without spoiling the overall effect of your shot. On the other hand, a sub-standard composition can make a spectacular room look quite ordinary, or even make the architecture itself appear badly designed.

Using Limitations Creatively

The same rules that apply to producing interesting and effective exterior shots also apply to interior situations, although in this case, the photographer's room for maneuver is much more limited. Including elements of the surroundings or the sky is impossible, and composing a shot to include just one specific part of a room quickly reduces the magnitude of the photo to a scale at which the building is no longer recognizable as such. In such cases,

individual architectural details or aspects of the interior design take on the role of the main subject.

However, these limitations also present opportunities for taking a more artistic approach to your photography – for example, by focusing on specific details such as the weather-beaten elements of a façade. Sequences of similar images with a common theme are also an effective way to portray architectural details, as is the use of unusual perspective or blocky, monotone compositions. There are no limits to what you can try out – skylights, staircases and mirrors are great features for experimenting with.

Using Proportions Creatively

It is important to analyze each room individually and to look for ways to emphasize its best features. The Rule of Thirds and the

Golden Ratio are both useful guidelines for producing well-proportioned images. The latter (approximately 1 : 1.618) is widely used in the arts and architecture to symbolize ideal proportions and harmonious aesthetics. If you arrange important features of a composition to correspond with these proportions (as shown in the image on page 104), the results are virtually guaranteed to be interesting and captivating.

The Rule of Thirds divides an image into nine sections using imaginary lines that divide the length and breadth of the frame into thirds. Arranging windows, door frames or walls to correspond with the vertical 'thirds' lines is another way to virtually guarantee effective results.

Creative use of doorways, arches, and other gaps in the surrounding structure often helps to produce interesting and unusual photos. Portraying the transition from an

interior to an exterior view also offers a whole range of new photographic possibilities. For example, the image on the previous page perfectly illustrates the seamless transition from interior to exterior that the building's architecture evokes. In cases like this, the unusual design immediately captures the viewer's attention and constitutes an unfamiliar, mixed form of interior/exterior photography.

Formally speaking, exterior spaces that behave in a similar way to interior scenes can be photographed using interior photographic

guidelines. Many of the tips and tricks mentioned in the course of this workshop can be applied just as well to capturing images of enclosed squares and yards that only differ from 'normal' rooms in that they have no roof.

Image Formats

The image format you choose can significantly influence the effect of an architectural image. Raw image data is captured using the format of the camera's sensor, which is usually 3:2 or 4:3. You also

have the choice of shooting in portrait or landscape format. If you want your results to look authentic, the format you choose should reflect the overall proportions of the space you are photographing. Obviously vertical structures such as the spiral staircase shown below cry out to be photographed in portrait format. In contrast to exterior situations in which the photographer can include elements of the surroundings (such as trees or the sky) to alter the composition, it is seldom possible to capture interior situations effectively using a format that doesn't correspond to the shape of a space or its features.

Experiments with formats that contrast with the basic shape of a space usually produce unattractive results. A portrait-format shot of a broad, low room will generally produce a poorly balanced image, with unimportant features such as the floor or ceiling taking up too much space in the overall composition. This is one of the reasons why the landscape format is the dominant form in interior photography.

People

Because they tend to dominate the scene and attract the viewer's attention, people are rarely included in interior shots. They also take the emphasis away from the structural side of the image and give it an overly personal touch. And because the size of the windows, doors, and other fittings is implicit within the space being photographed, human subjects are also rarely required to illustrate scale.

If precise representation of the design is less important, you can use artistically blurred or implied human subjects to emphasize the feeling of space in an interior shot. To create this type of effect, select a long exposure time (in the case of the image shown on the right, 0.8 seconds) and have your human subject perform a preplanned movement or sequence of movements while the shutter is open. The result will be an unusually dynamic interior photo.



Using an image format that accommodates the dominant feature of the subject gives you plenty of freedom when composing an image



Using movement to add artistic flair to an interior shot

f10 | 0.8 s | ISO 100

Know Your Rights

It is not always permitted to take pictures in every building that is theoretically photographable. The laws applying to interiors and their contents are more restrictive than those that apply to photographing exterior scenes. This usually means that you require explicit permission to photograph the inside of public or private rooms for personal and commercial purposes.

Owners and landlords usually have the power to exercise property rights and, as

such, can decide whether to grant or refuse permission to take photographs and/or to allow the use of photo accessories such as flash or a tripod. If you plan to publish interior architectural photos, you will often require the architect's permission too.

It is easiest to secure permission to shoot interiors if the owner is someone you know personally.

It is particularly important to ensure that you have the correct permissions to shoot

inside airports, railway stations, banks and government buildings, as these are nearly always subject to additional security considerations. Never assume that you can shoot without permission in any public place, especially indoors.

The rules and regulations that apply vary from country to country, so if you are in any doubt at all as to whether you are allowed to shoot, it is always better to miss a shot than to get embroiled in legal difficulties.

Photographing Enclosed Spaces

Once you have found your subject and decided how you want to portray it, you can concentrate on producing a feeling of three-dimensional space within the image. The following sections detail some useful tips and grass-roots knowledge about how to view space and capture it photographically.

The choice of camera positions when shooting in indoor situations is severely limited compared to the freedom you have when working outdoors. It is only really possible to produce realistic-looking interior shots if you work backed up against a wall or if you use openings in the architecture, such as arches or doorways, to increase the distance between the camera and the subject.

Perspective

Interior spaces usually have square or rectangular floor plans, giving the photographer the basic choice of shooting with one-point or two-point perspective. A shot with one-point perspective like the

left-hand one below involves positioning the camera along the room's central axis and shooting in the direction of the rear wall (i.e., directly at the cubic object). The wall is oriented parallel to the sensor/film plane, thus limiting the feeling of depth and preventing the appearance of vanishing points. This type of composition works well in small rooms, although the overall effect is not particularly dynamic.

In contrast, photos with two-point perspective are shot with the camera pointing diagonally into the space, so that all non-vertical lines converge towards imaginary vanishing points on the (usually invisible) horizon and all horizontal lines contribute to the feeling of depth. As the right-hand photo below

illustrates, this approach produces a greater feeling of depth. However, this type of image is sometimes too dramatic and can result in inharmonious compositions, especially in narrow spaces.

When comparing photos taken using a single lens, the larger a room, the more distant the rear wall and the more accentuated the feeling of depth will be. In very large rooms, the strongly converging horizontal lines in the walls make the resulting image quite dynamic. This effect is particularly strong in images of symmetrical spaces that are shot to emphasize their symmetry.

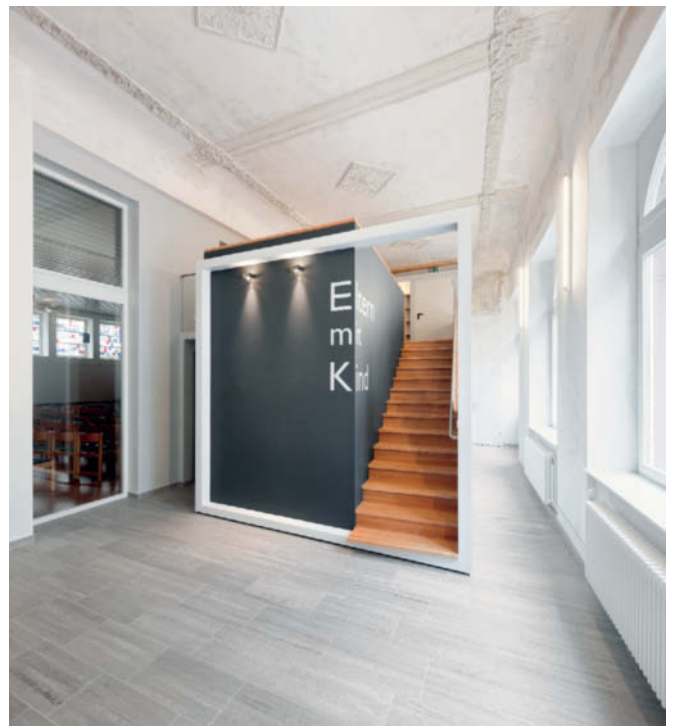
The viewpoint you choose will depend not only on how you wish the finished image to look, but also on physical limitations, such as the arrangement of the furniture or fittings, the direction the incident light comes from and any light emanating from mixed sources. You may find that it is simply impossible to shoot using one-point perspective because the relevant parts of the room are full, or because a central viewpoint would produce unwanted reflections that would require subsequent retouching.

Positioning the Camera

Shooting at eye level (approximately 180 cm above ground level) produces natural-looking



One-point perspective gives this shot a clean, uncluttered look (17mm equivalent focal length)



Photographing the same space using two-point perspective gives the image a much more dynamic feel (17mm equivalent focal length)



Shooting from a low viewpoint helps to give a small space a feeling of added depth and height

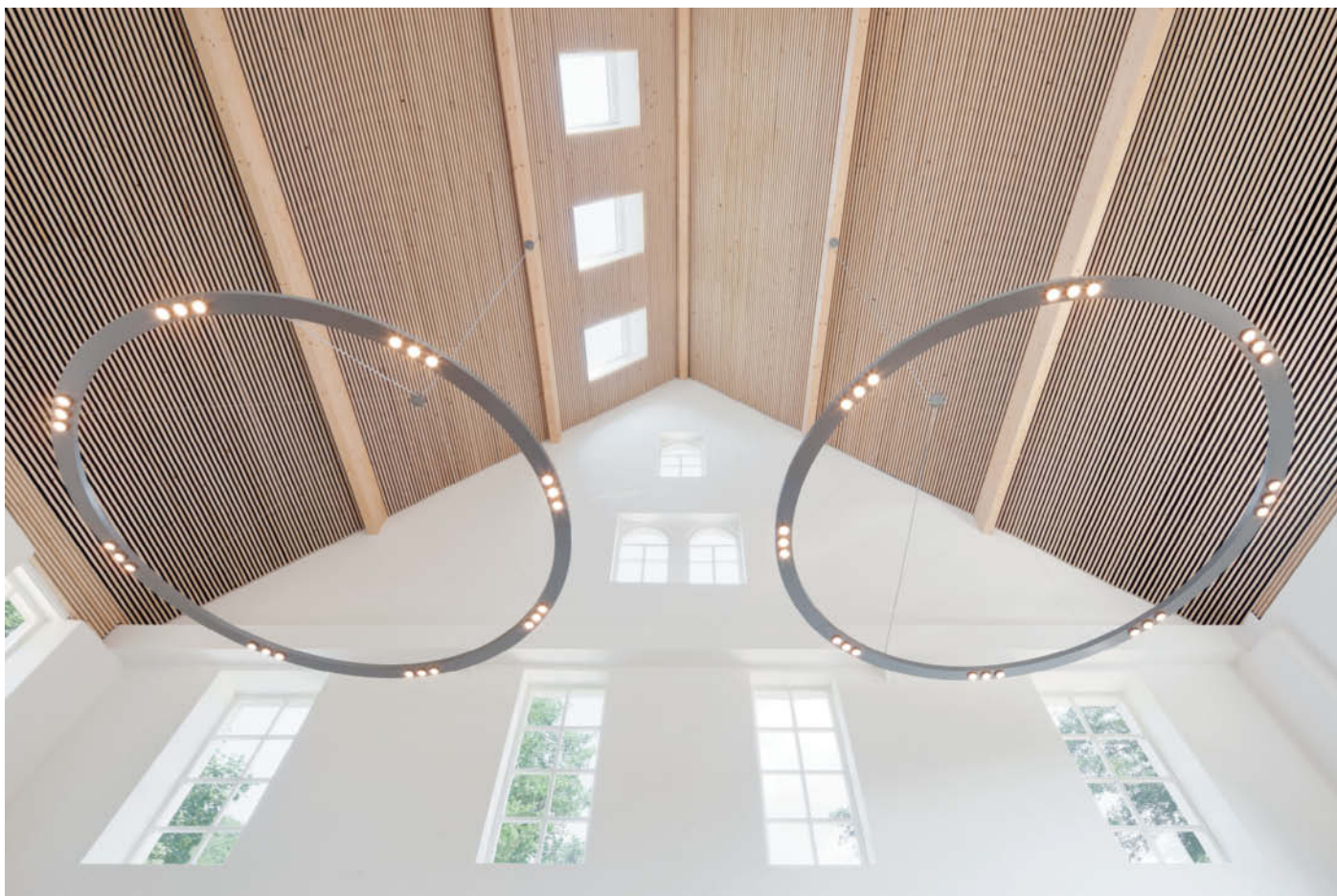
interior shots. The viewer usually instinctively assumes that interior shots have been taken from this position, and you can make low-ceilinged rooms appear more spacious if you shoot from slightly lower (between about 100 and 120 cm above the floor). However, lower camera positions also increase the risk of some objects within the space blocking the view of others. As an example, you should consider whether the view under a table is preferable to the view along its surface. Only shoot from above eye level if you have to – for

example, to prevent a piece of furniture or an architectural feature from spoiling your composition. Shooting above eye level can also be necessary if you need to emphasize the depth of distant objects within a space.

Room Height

Converging verticals are less of a problem in interior situations than they can be when shooting outdoors because the difference between the height of the space being

photographed and the vertical scope of the image is much less pronounced. Because interior shots contain fewer important visual elements in the upper parts of the frame, it is easier to shoot in landscape format than it is in exterior situations. However, even slightly off-kilter verticals quickly make interior shots look strange, so it is important to ensure that your camera is aligned correctly. If you still end up with verticals that need correcting, you can use dedicated software such as *ShiftN*, which is included on this issue's free DVD.



Converging verticals are used as part of the composition to increase the tension in this photo of a high ceiling (17mm equivalent focal length)

If you are photographing the interiors of churches or other extremely high-ceilinged spaces you will need to shoot either from a high viewpoint (for example, from a gallery) or using a shift lens that is capable of eliminating converging verticals while you are shooting.

Alternatively, you can shoot using a lens with a wider angle than the situation actually requires and shoot with the camera oriented vertically instead of horizontally. This eliminates converging verticals but shifts the subject itself toward the top of the frame, leaving large areas of the ground visible in the lower half of the frame, which you can correct later by cropping.

You can, of course, use converging lines deliberately as an additional compositional element. The extremely dynamic photo

shown above was shot from a very low standpoint with the camera pointing almost vertically upward from the center of the room.

Lenses

In order to capture as much of an interior as possible, interior shoots generally require the use of wider-angle lenses than most outdoor situations. We recommend lenses with equivalent focal lengths of 24 mm or less – i.e., with an angle of view of 84 degrees or more. A good example is the Canon EF 14mm f/2.8L II USM. Most DSLR systems include one or more lenses in this range.

An ultra-wide-angle zoom lens is a very useful tool in interior situations. 7-14mm (14-28mm equivalent) lenses designed for use with the Four Thirds system can cost as much

as US\$1800, but 9-18mm (18-36mm equivalent) lenses are available for more reasonable prices of around US\$700. Owners of APS-C or DX-format cameras have the widest choice of manufacturer's own or third-party lenses made by Sigma, Tamron and Tokina.

The Sigma 8-16mm F4.5-5.6 DC HSM for Canon, Nikon, Pentax, Sony and Sigma cameras offers its users an astonishing equivalent minimum focal length of 12mm and costs around US\$700. There is also a wide range of ultra-wide-angle prime lenses and zooms available for full-frame cameras manufactured by Nikon, Canon and Sony. Wide-angle zooms start at 16 or 17 mm and have ranges that extend up to 28, 35 and even 40 mm. Nikon's AF-S Zoom Nikkor 14-24mm f/2.8G ED AF is an excellent choice, as is the Sigma 12-24mm F4.5-5.6 EX DG ASP HSM II,



The use of an ultra-wide-angle lens emphasizes the receding lines that dominate this image (14mm equivalent focal length)

currently the widest-angle zoom on the market. Alongside these lenses, specialized tilt/shift models, such as the Canon TS-E 17mm f/4L and TS-E 24mm f/3.5L II are perfect for interior shoots – if you can afford them!

Fisheye lenses are rarely used to shoot conventional interior photos, but can come in handy for shooting the source material for 360-degree spherical panoramas that can be viewed using interactive Web-based tools (see also our article on presenting gigapixel images in Issue 7 of *c't Digital Photography*).

Spatial Depth

The combination of wide-angle lenses with broad angles of view and short subject distances often create an impression of space that exceeds that of the room being

photographed, which can produce photos with misleading proportions. In contrast to most exterior situations, in which realistic reproduction of size and space are very important, most architectural photographers accept the disproportionate nature of interior shots, especially as it rarely spoils (and can sometimes even enhance) the effect of the design. Real estate agents often use this effect to produce attractive promotional photos.

However, even if ultra-wide-angle lenses and panorama techniques allow us to capture images of rooms with limited space, it is important to exercise caution when choosing a lens. A good rule of thumb for choosing focal length is: as short as necessary but as long as possible. Our aim is not to test the physical limits of our equipment, but rather to produce interestingly composed, well-lit

images with a clear message. Extreme wide-angle effects are seldom beneficial to an image. Having said all that, there is, of course, nothing to be said against using ultra-wide-angle lenses to produce intentionally artistic effects. For example, the use of an extreme wide-angle lens in the image shown above accentuates the symmetrical look and the receding lines that dominate the image.

The best lens to use also depends on the nature of the room itself. The taller and shallower a space, the wider the angle required to reproduce its volume in a harmonious, realistic-looking way. The converse is also true: the longer and lower a space, the longer the focal length you should use to photograph it if you want to retain realistic proportions in the finished image.

All About Light

Reflective surfaces, exterior and interior light sources and your own flash gear are all factors that have to be controlled and used selectively in interior photographs. Sometimes, post-processing is the only way to tease the right look out of a tricky scene.

Interior photographers constantly have to deal with as many as three separate sources of light, namely: incident natural light, artificial indoor light and photographic flash. These not only have varying intensities but can also have very different color temperatures, thereby confronting the photographer with the twin challenges of extreme ranges of brightness and mixed lighting moods.

Extremes of Brightness

The differences in interior and exterior lighting are particularly obvious in and around windows, which often produce extreme

ranges of contrast that neither digital nor analog cameras can capture in a single image.

The simplest approach to this problem is just to accept that windows will appear extremely bright and detail-free if you want to produce a balanced exposure for the rest of a room. It is often the case that objects and elements outside the room are irrelevant or distracting anyway. All you have to do is take a matrix or center-weighted meter reading for an averagely bright area that contains no windows. Once you have selected your exposure values (in manual mode) or saved the meter reading (refer to your camera's manual to identify the appropriate button)

you can reframe the image to include the over-bright areas and release the shutter.

Always use the histogram display to make sure you have captured the maximum range of tonal values – the histogram curve for a well-exposed image should reach but not intersect with the left-hand (shadow) end of the scale and should cross the right-hand (highlight) end at as low a level as possible.

Although wirelessly controlled flash units can spoil the precisely calculated look of a room's lighting, they do balance interior and exterior light sources effectively. The units should be positioned so that they do not produce any obvious shadows and are not visible within the frame. Ideally, they will make it look as if the darker areas of the scene are lit by natural light. The powerful, flexible flash units necessary to create this type of effect are beyond the budget of many hobby photographers, although smaller dedicated flash units with built-in radio- or infrared remote control functionality can be used off-camera to brighten darker image areas, as shown in the image opposite. In this case, the flash was positioned to the right and below the camera and was fired from close to the wall.

The larger the room and the brighter the light entering the windows (and the stronger the subject contrast), the more difficult it is to produce adequate lighting using conventional flash equipment. For example, to light a medium-sized room with large windows and no artificial light, the solution is to deliberately underexpose to keep details beyond the windows visible and light the rest of the frame by firing several indirect, high-power flashes in different directions while the shutter is open.

If the shutter speed you are using makes it impossible to fire multiple flashes during the exposure, you can always use a sequence of images to produce the result you are looking for. Position your flash for each image so that it illuminates a different part of the scene without itself being visible in the frame, but try to avoid positioning it behind or to the side of the camera. It is then relatively simple to use layers and masks in an image processing



The color temperatures of natural and artificial light sources can be adjusted to suit each other during post-processing



In this photo, the otherwise unlit foreground has been brightened using off-camera flash

program to merge a sequence of source photos into a single, well-exposed image. There is also specialized software available for performing light-balancing tasks, such as *HDR ReLight* by Oloneo, which allows you to control the impact of the light sources in your source images individually. This technique can also be used to photograph unlit rooms with no windows at all.

Another effective way to produce interior shots with balanced lighting is to shoot a bracketing sequence and merge the resulting images using HDR or DRI techniques. This ensures that the finished image contains detail across the entire frame and that deep shadows and bright highlights are not clipped. It is important not to overdo HDR and DRI effects, as they can quickly produce unrealistic-looking results. The image on page 116/117 is a good example of a successful merged image that isn't immediately recognizable as such.

Don't attempt to darken your highlights so much that they could pass for midtones, as this only produces photos that look like paintings. Always aim to keep contrast realistic-looking while preserving visible detail in both highlight and shadow areas. A bracketing sequence should consist of at least three (or, in situations with an extreme range of contrast, five) source images with exposure values ranging between -2 and +2 (or -3 and +3). These figures represent the numbers of f-stops (i.e. EVs) below or above the standard exposure that the camera's meter calculates for the scene at hand when using a fixed aperture value.

Mixed Light Sources

Bright room lights generally dominate in mixed light situations. Artificial light sources with different color temperatures can be tricky to capture, and the simplest workaround here is to switch off any lamps whose color temperature differs widely from that of the dominant light source. Interior (warm) and exterior (cool) color temperature differences always present a challenge, so if you want to be able to adjust white balance after shooting without reducing image quality, you will have to shoot using your camera's native RAW format.

If you use additional flash to brighten a room that has little or no artificial light, you can use special blue-colored filter gels (for example from LEE filters) attached to the flash to adjust the temperature of the flash light to match that of the immediate environment. There are also filters available that warm flash light to match a dominant artificial light source.

Attaching colored gels to windows to match the outside light to the artificial indoor

lighting is often too complex an approach to apply successfully. It is simpler to shoot after dark – provided that this doesn't spoil the intended mood of the image. The temperature of daylight during the 'blue hour' just after sunset is particularly cool, so if you can, it is best to wait until dark. Take care that reflections of the interior in the room's own windows don't change the look of the space too much. If necessary, you can always close curtains or blinds to deal with this.

The blue tint of natural light can always be corrected during post-processing. For example, selective color correction and a number of adjustment layers were used to correct the cool natural light in the image on page 112 to match the warmer interior lighting. The result is a balanced image with harmonious overall color temperature.

The results of this type of processing depend on how much image editing experience you have had. If you are still learning this type of technique, always err on the safe side when applying untried effects – an image that has been tweaked too little usually looks better than one that is obviously overcorrected.

If you are using HDR or DRI techniques and your image contains a significant amount of natural light, you can use cooler white balance settings to 'develop' the overexposed source images, and warmer settings for the underexposed ones. This approach assumes that brighter image areas are lit by daylight and that darker areas are lit artificially and is an effective way to attenuate strong differences in color temperature, even if it cannot eliminate them entirely.

There are no hard and fast rules governing the number and strength of lamps you can use to light a room, so the best solution is to give yourself a choice by taking multiple shots of a single scene using as many different lighting setups as possible. Bright overall lighting is better in some situations (such as offices or technical situations), while selective use of individual accents is better in cozy living room, bedroom or dining room shots. If, for example, the sun is low in the sky and its light enters a room via a window, the best approach can be to do without artificial light altogether, as illustrated by the image above. In this case, the sun is the only light source, and gives the image a balanced overall look, allowing the photographer to set a precise white balance value and prevent color casts.

How to Avoid Camera Shake

It is difficult to exercise significant influence over the found lighting in interior situations,



so you will generally have to adjust your exposure to fit each situation individually. Regardless of how well lit it is, the interior of a building is usually darker than its exterior, which means you will generally have to use longer exposure times to prevent underexposure in indoor situations. This is not usually a problem as the exposure time is the most flexible shooting parameter and there is very little risk that the subject (or part of it) will move during an exposure is extremely low. However, longer exposure times also increase the risk of camera shake spoiling handheld shots.

It is generally inadvisable to shoot architectural photos with the aperture wide open, especially if you are not using a high-end lens. Wide apertures produce more visible lens errors and the resulting shallow depth of



The balanced color temperature in this shot was achieved by using only natural light

field can cause close or distant details to be reproduced out of focus. Stopping the lens down to a medium aperture generally helps to reduce the risk of camera shake and also makes the image sharper. Wide-angle lenses generally produce their best results at apertures between f8 and f11.

Only use your maximum aperture if you have already increased your ISO value as far as you can. A correctly exposed image shot using a high ISO value nearly always looks better than one with edge blur, chromatic aberrations, vignettes, or too little depth of field. However, exercise caution when increasing your ISO setting. It is best to use the camera's lowest default value (usually ISO 100) if you want to make sure that you have enough image quality in reserve for editing later on.

The surest way to ensure shake-free images is to shoot using a tripod, a remote shutter release and mirror lock-up. However, if you are travelling, a high-quality tripod is often too heavy and too complicated to set up for spontaneous shots. In such cases, a monopod is a great alternative tool. A quality monopod made of carbon fiber is compact, can weigh as little as 500 grams (one pound) and often works just as well as a tripod. You can also lean a monopod with a mounted camera on walls or chairs for extra support in particularly dark spaces. Some monopods double as hiking sticks too.

A beanbag is another alternative camera support. Although not quite as versatile as a monopod, a leather or cloth beanbag is even easier to use and can be placed on walls, ledges and items of furniture to help support

and orient your camera as well as absorbing unwanted vibrations. See our article on home-made studio gear in Issue 6 of *c't Digital Photography* for details on how to make your own.

If there is no tripod or horizontal surface at hand, you can even use the wall to support your camera (and a fingertip to support the lens) while taking portrait format shots. If you lean against the wall while doing so, your upper body will remain still when you release the shutter.

If none of the above options apply to your situation, you will simply have to rely on the steadiness of your hand. Breathe steadily and try to release the shutter between breaths. In critical situations, taking multiple shots of a subject increases your chances of producing at least one shake-free image. (anm) **ct**



Here, DRI techniques were used to combine multiple source photos from a bracketing sequence in an effective finished image





Maïke Jarsetz

Lightroom 4

Not only does Lightroom 4 offer the completely new Map and Book modules for organizing and editing GPS data and creating photo books, it also includes a new process version, video editing functionality, a whole bunch of enhanced editing tools and a number of improvements in the overall workflow. This article runs through the new features and goes into detail on some of the highlights.

Once again, the latest version of *Lightroom* presents its users with a new process version for converting RAW data into RGB files. As always, this process plays a major role in determining overall image quality. Process Version 2012 (PV2012) is an integral part of the program's Develop module and includes revised tone controls that have been designed to have less direct effect on one another. The Highlights, Shadows, Whites and Blacks sliders are used to control bright and dark tones as well as highlights and shadows, and they replace the Recovery, Fill Light and Blacks sliders found in version 3. The Exposure slider is responsible for adjusting midtones, making the Brightness slider used with earlier process versions redundant.

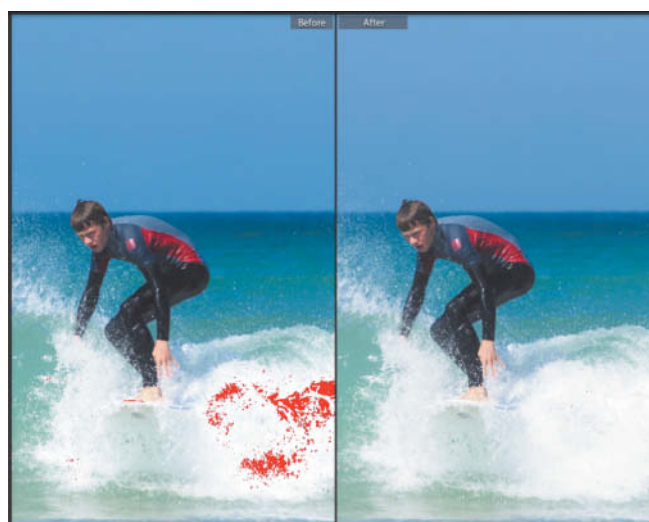
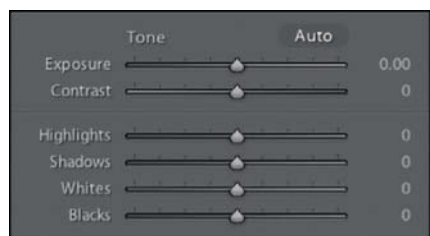
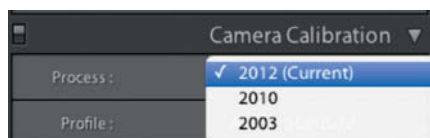
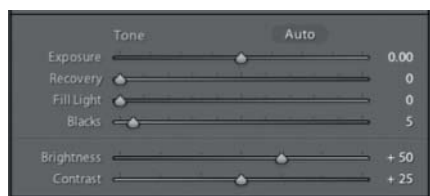
Shadows and highlights can be more precisely adjusted using the new process version, providing better overall detail rendition. The improved quality of the new algorithm is highly visible when switching between the 2010 and 2012 process versions, giving us finer shadow detail and more rescued highlights. If you prefer to avoid any potential surprises it is, of course, possible to retain earlier process versions for images that you have processed using earlier versions of the program.

Many of the development tools have been revised, and my personal favorite is the color temperature tool that has been added to the local adjustment options. This great tool enables you to produce highly realistic images of subjects that include varied color

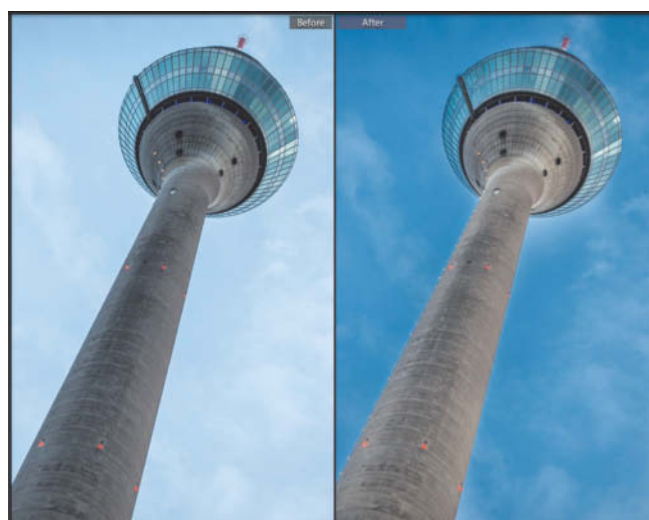
temperatures – an adjustment that was only possible in earlier versions of the program by applying a partial mask. You can now adjust local color temperature using the Adjustment Brush and the Graduated Filter tools.

Noise reduction, too, can now be applied locally, enabling you to adjust shadow detail selectively without adversely affecting the sharpness of the rest of your image.

The Lens Corrections panel now includes a much wider range of built-in lens profiles. The Chromatic Aberration correction tool, which now has its own algorithm, is no longer directly integrated into the lens corrections. This means that it can be used to analyze and correct image data independently of the lens profile in current use.



The revised Tone sliders underscore the increased precision with which the new process version processes highlights and shadows (the PV2010 version is shown above left, PV2012 below left)



Local adjustments to color temperature and tint make it simpler to process a wide range of tricky subjects



A simple workaround enables you to develop video files using exactly the same tools as for still images

Advanced users will recognize an extra portion of *Photoshop* in the new *Lightroom* version in the form of separate red, green and blue channel Tone Curve adjustment functionality. This new finesse gives advanced users the opportunity to perform better selective midtone adjustments and more balanced weighting between shadows and highlights.

Managing and Editing Video

Lightroom 3 allowed its users to import video files, but didn't include any video processing

functionality, and even previewing video files involved the use of an external editor. *Lightroom 4* allows you not only to play videos in the preview window, but also to perform basic video editing. The main video tool is the video playback control bar, which you can adjust in size to fit into the Library module's preview window.

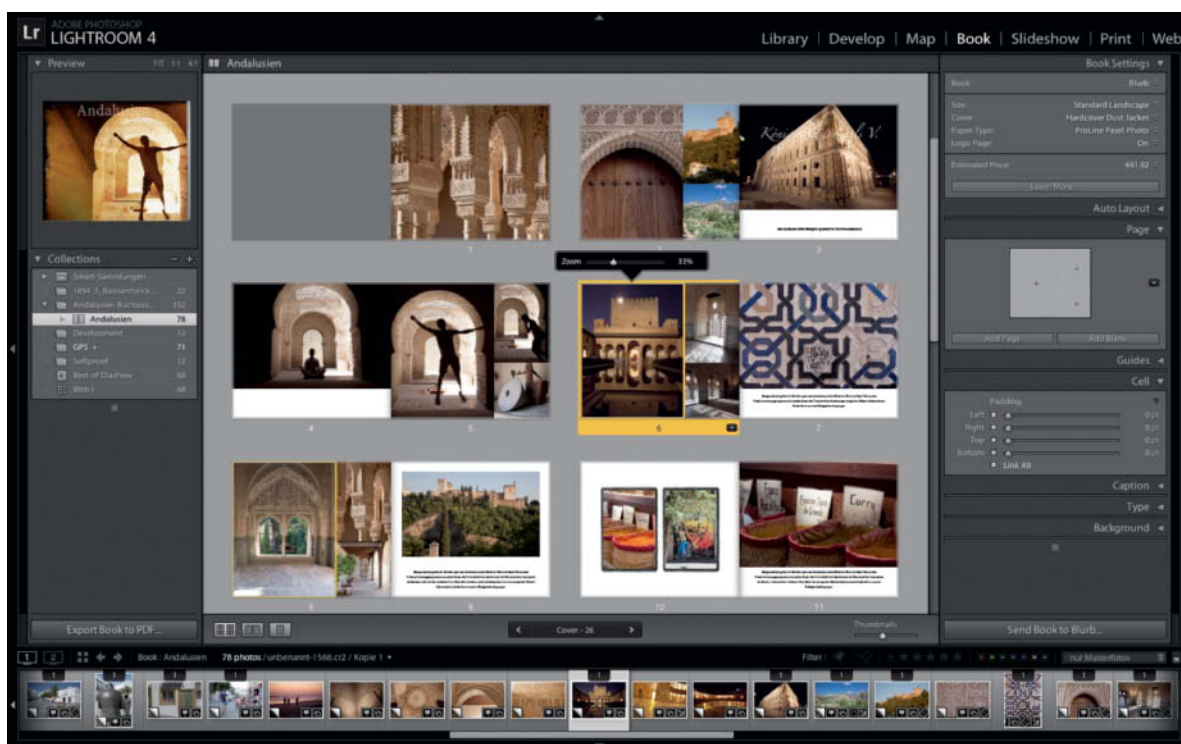
The control bar includes basic video editing functions such as trimming and stills capture. There are sliders for selecting new start and end points, or you can use the Shift+Alt+I and Shift+Alt+O keyboard shortcuts to perform the same tasks. To

capture a frame, simply click the Frame button and select the *Capture Frame* option in the pop-up menu that follows. The *Set Poster Frame* option sets the selected frame as the thumbnail for the clip you are working on.

At a first glance, all of the tools in the Develop module are grayed out when you view video files. However, a simple workaround allows you to apply develop steps to an entire video clip. All you have to do is edit a captured frame, save the edit steps you perform as a preset and apply it to the video file in the Quick Develop panel in the Library module. It's simple when you know how!

Creating Photo Books

The new Book module is probably the widest-ranging of all the changes Adobe has made to the program, although – just like *iPhoto* and *Aperture* – it is limited to the use of a single service provider for printing your finished book. In *Lightroom's* case, this is the international Blurb service, which produces



The Book module offers a wide range of layout options, but currently only works with the Blurb online photo book service

The Soft Proofing tool marks image areas that lie outside the gamut (i.e., the color range) supported by your display or output device

high-end products at high-end prices. If you prefer not to use Blurb, you can always save your book project as a PDF and have it printed elsewhere. It remains to be seen whether Adobe will use the Lightroom Exchange Server or other interfaces to link to other providers.

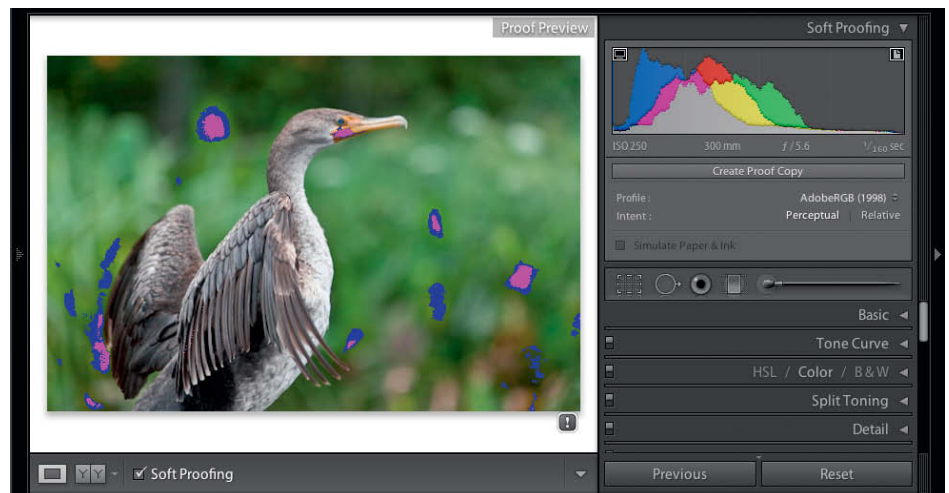
Making a photo book using the program's default settings is simple, and you can tweak your layout using a wide range of tools. All you have to do to get started is select a format, a paper type and the type of cover you want to use. You can then select one of the page templates provided. These offer various numbers and layouts of photos and text boxes per page and you can drag and drop photos to insert them. The Auto Layout tool does just what it says and automatically fills preset page layouts with your selected images. You can customize image positions, sizes etc. yourself once the program has done the donkey work. Text boxes can be automatically filled with image metadata and formatted text can be saved as a preset that you can then select for use with the Auto Layout tool.

Additionally, you can select custom background colors, images or graphics and choose from a wide range of captioning options for whole pages or individual photos.

Working with GPS Data

The new Map module automatically integrates GPS metadata from your photos into a Google Map. You can then search for places using a search box or simply drag and drop photos that don't (yet) have geodata associated with them to the map, where GPS data is automatically added. You can also use a GPX log file recorded using a logger or a smartphone to automatically add an annotated path to the map. Any photos you then drag to the map are automatically placed at the correct location using the metadata time stamp as a reference.

Saved Locations is one of the really cool features of the Map module, and enables you to define the mutual proximity of a set of photos. For example, if you travel to Greece for a shoot, you can create a Saved Location that encompasses the islands you visit by



setting the Radius value (in feet, miles, meters or kilometers) to cover your chosen area. All photos with GPS coordinates that lie within the selected radius are then automatically allocated positions on the map. This is a great tool for finding all the images that belong in large geographical areas.

Other Improvements

Built-in soft proofing is one of the major new features in *Lightroom 4* that Adobe announced in advance of its release, although it hasn't yet lived up to everyone's expectations. Because *Lightroom* processes RAW image files in the ProPhoto RGB color space, it is only capable of displaying soft proof previews for images with RGB color profiles. This limits the usefulness of the Soft Proofing feature to photographers who want to output their images to the Web or a profiled printer. CMYK soft proofing is not yet part of the *Lightroom* deal, but we will be following future developments in this area with interest.

Once Soft Proofing has been activated (View > Soft Proofing), the clipping warnings in the histogram switch functions and become out-of-gamut warnings instead. This enables you to tweak your image adjustments to suit your chosen output medium. The Print module now also includes dedicated sliders for adjusting print brightness and contrast, but be warned: adjustments made at the printing stage have nothing to do with 'real' color management.

E-mail delivery has also been streamlined in the new version and can be accessed directly instead of having to save your favorite e-mail client as an external editor in an export preset. You can now configure your e-mail account, add recipients'

addresses and adjust the quality of the attached images directly in a separate window. In its beta version, *Lightroom 4* still worked with its own address books, making it less practical for sending one-off attachments. However, the release version has better address book integration that is sure to be further improved in future.

The new DNG compression options are another useful addition to the program's export functionality. You can now not only adjust the quality of the Preview, but also apply (lossy) adjustments to image resolution that reduce DNG files to an eighth of their original size.

Adobe has also opened up the *Lightroom* Web publishing interface, allowing you to use the Find More Galleries Online button to add services to the Lightroom Exchange Server.

One final improvement that is also worth mentioning: the Develop Presets that used to appear as a long list in the Presets drop-down in the Quick Develop and Import dialogs are now displayed using the same folder structure used to save them in the Develop module. This may appear to be a small detail to some users, but is an enormous help to others. This is just one of a wide range of small but eminently useful changes that have been made, including new zoom levels, custom aspect ratios in the Crop dialog, an improved loupe view when adjusting white balance and much more besides.

Conclusion

Lightroom's two new modules and many of the smaller changes are Adobe's direct answer to the many user requests it receives. The new process version represents a significant improvement in the program's core RAW development functionality. (pen) **ct**



Dmitri Popov, Andrea Mueller

Publish and Share **Self-hosted Photo Sharing with Gallery**

There are a lot of advantages to hosting your own Web-based photo publishing solution instead of using the Flickr, SmugMug and others. Self-hosting gives you full control of your content and eliminates concerns about losing your work if your chosen provider changes its terms of service or shuts down. And, perhaps most importantly, if you run your own gallery, you can customize anything and everything.

When it comes to sharing photos on the Web, there is no lack of commercial services out there. Flickr, Picasaweb, SmugMug and 500px are all popular choices among amateur and professional photographers alike. The major disadvantages of using a third-party service are the (usually) limited disk space and the fact that you have to trust your precious work to a stranger. What would happen if your chosen provider has technical difficulties or goes out of business? What security measures does the provider take? Third-party providers are also no use if you need to publish your material on a company intranet.

The obvious solution to issues like these is to host your photos yourself, either on a rented server or on a computer attached to your local network. An additional advantage of doing things this way is that you have complete freedom regarding the design of your gallery, allowing you to precisely specify fonts, thumbnail sizes, background colors and the overall look of your Web presence. You can also modify themes to your liking or create your own from scratch, and you can extend the default functionality of your photo sharing system using plug-ins.

First Things First

Of course, there are a few things you need to consider before you switch to a self-hosted photo publishing application. Hosting your

own gallery means that you are responsible for deploying and managing it and, although most open source photo sharing solutions are pretty straightforward to use, some basic technical skills are required during installation and for performing routine maintenance. If you choose to host your photo gallery on your own server from the convenience of your home or office, you also need to have a fast and reliable Internet connection and possess a working knowledge of server administration. If all these challenges don't sound insurmountable to you, you might just be ready to take the plunge and deploy your very own self-hosted photo publishing and sharing solution.

Installing and Configuring Gallery

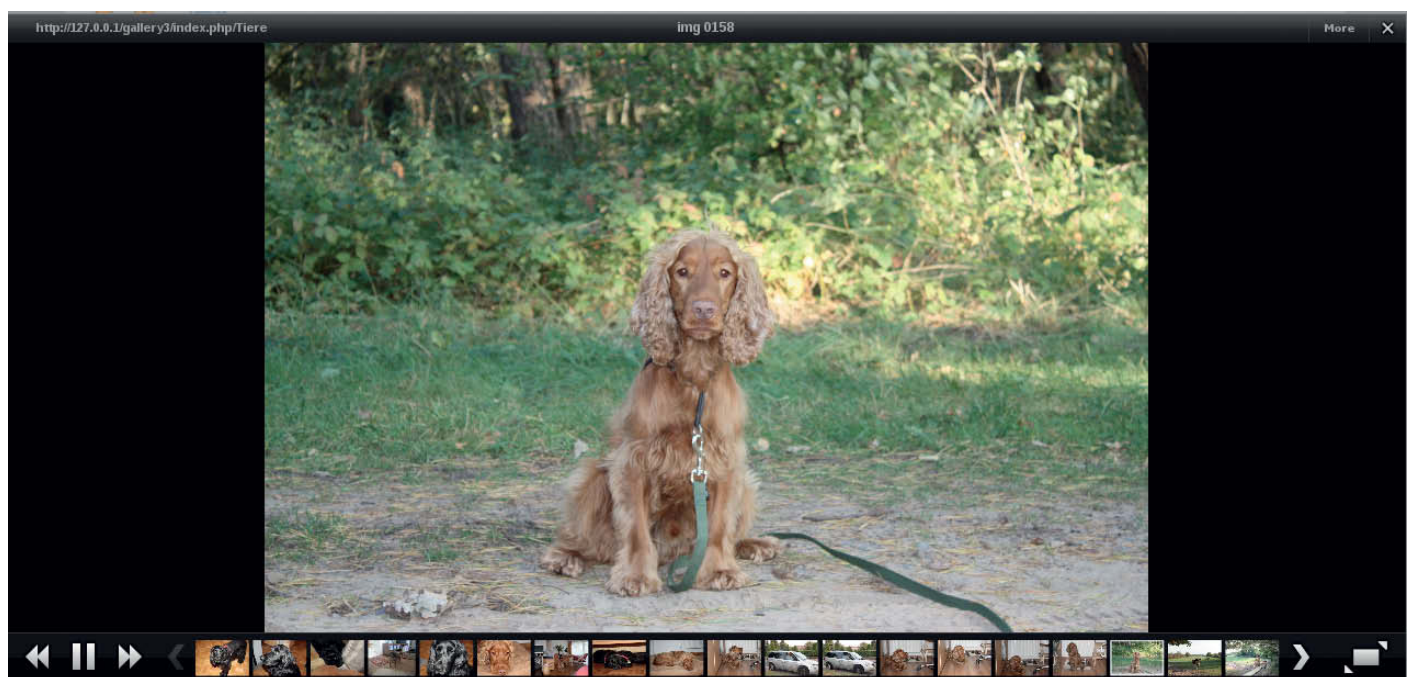
The first thing to do is choose your photo publishing and sharing software. There are various excellent solutions available, from simple web-based applications like *Zenphoto* to more advanced, feature-rich systems like *Piwigo* and *Coppermine*. However, if you are looking for a mature, well-documented platform with a lively community of users and developers, you can't go wrong with *Gallery* (<http://gallery.menalto.com/>). The software is written in PHP and runs on any server that

supports PHP and MySQL. This article looks at the installation and use of *Gallery* in Windows and Linux environments. Even if Linux is a niche operating system on home computers, it is still used on most hosting providers' virtual and root servers.

Installing Gallery in Linux

Gallery is very quick to set up in a Linux home computer or server environment. The simplest solution is to run it on a rented server, as all the required components – such as an Apache Web server, a MySQL database and PHP – are pre-installed. Using your own server keeps you in full control of both hardware and software, but you need to set up a dedicated machine and you will be responsible for keeping everything running smoothly. Going with a hosting provider makes sense if you already have a website and your provider offers the required components (you can view the list of requirements at codex.gallery2.org/Gallery3:Requirements).

If you decide to run *Gallery* from home, you will first need to install appropriate Apache, PHP5 and MySQL distros on your system. The operating system itself will ensure that all required dependencies are installed. Depending on which flavor of Linux you are using, the first time you open *Gallery*



An album and slideshow created using *Gallery*

Installation



Whoa there!

There are some problems with your web hosting environment that need to be fixed before you can successfully install Gallery 3.

- PHP is missing the [iconv extension](#)

[Check again](#)

Did something go wrong? Try the [FAQ](#) or ask in the [Gallery forums](#).

The first time a browser accesses the program, it checks whether all system requirements are fulfilled and lists any missing modules



Let's get going!

Installing Gallery is easy. We just need a place to put your photos and info about your MySQL database.

Photo Storage

We've found a place to store your photos:

`/opt/lampp/htdocs/gallery3/var/`

Database

Gallery 3 needs a MySQL database. The values provided work for most setups, so if you're confused try clicking *continue*.

Database name	<input type="text" value="gallery3"/>
User	<input type="text" value="root"/>
Password	<input type="text"/>
Host	<input type="text" value="localhost"/>
Table prefix	<input type="text"/>

Did something go wrong? Try the [FAQ](#) or ask in the [Gallery forums](#).

The installer requests input regarding the database details. This is where you enter the name of the database and the administrator's user name.



Success!

Your Gallery 3 install is complete!

Before you start using it...

We've created an account for you to use:
username: `admin`
password: [obscured]

Save this information in a safe place, or change your admin password right away!

[Start using Gallery](#)

Did something go wrong? Try the [FAQ](#) or ask in the [Gallery forums](#).

Installing Gallery is a straightforward process and uses a wizard to guide you through the required steps

in a browser window, you may find that some of the PHP modules required to run *Gallery* are missing. Details about what to do if this happens are listed later. Many Linux distros require you to select a MySQL root user password during installation. If this is not the case with your system the root password remains empty, and you should

run the following commands at the first opportunity to rectify the situation:

```
mysqladmin -u root password "my_password"
mysqladmin -u root -h localhost password "my_password"
```

You can now download *Gallery3* from gallery.menalto.com or copy the ZIP archive from this issue's free DVD. Open a terminal

and use the command `cd` to navigate to the Web server's document root. The folder is usually located at `/var/www/html`, although OpenSuse uses `/srv`. Now navigate to the user root using the `su` command (or `sudo su` for Ubuntu and its derivatives) and unpack the *Gallery* archive using

```
unzip /pfad/zu/gallery-3.0.3.zip;
```

Now navigate to the newly-created *Gallery* folder using `cd gallery3` and use the `mkdir var` command to create a new 'var' sub-folder and apply `chmod 777 var` to give it appropriate user rights. Now all that remains to do is create a new My SQL user and a *Gallery* Database – otherwise you will have to create and administer the *Gallery* database as root user, which is not advisable for security reasons (the root user has unrestricted access to all MySQL databases).

To create a new *Gallery* database user profile, start the interactive MySQL client in a terminal window using

```
mysql -u root mysql -p
```

and your previously defined root password. The following commands create a new, empty *Gallery* database and a new user called 'gallery' with full access to the contents of the database:

```
CREATE USER 'gallery'@'localhost' IDENTIFIED BY 'password';
CREATE DATABASE gallery3;
GRANT ALL PRIVILEGES ON gallery3.* TO 'gallery'@'localhost' WITH GRANT OPTION;
```

All other changes and adjustments can now be made directly in a browser window via the *Gallery* interface, which is described below in the sections following the description of the Windows installation process.

Installing Gallery in Windows

The simplest way to install *Gallery* in Windows is to use the XAMPP package (www.apachefriends.org/en/xampp.html), which automatically installs Apache, MySQL and PHP. If you decide not to run Apache and MySQL as system-level services during installation, you can still start the server at any time via the Windows Start menu.

Before installing *Gallery* itself, you have to create a new database and a dedicated user. Start the MySQL client either in a command prompt window using the same commands as described in the Linux section above, or using the Web-based MySQL administration tool PHPMyAdmin that is installed with the XAMPP package. You can start the tool either using its Start menu entry or by entering <http://127.0.0.1/phpmyadmin> in your Web

browser. Once you have taken these steps, you can unpack the Gallery archive (downloaded from gallery.menalto.com or copied from this issue's free DVD) to the Web server's document root located by default at c:\xampp\htdocs. The unpacking process automatically creates a folder called 'gallery3'. Now create a sub-folder called 'var' for your photos and use the Properties options in the context menu to deactivate its write protect option.

Getting Started

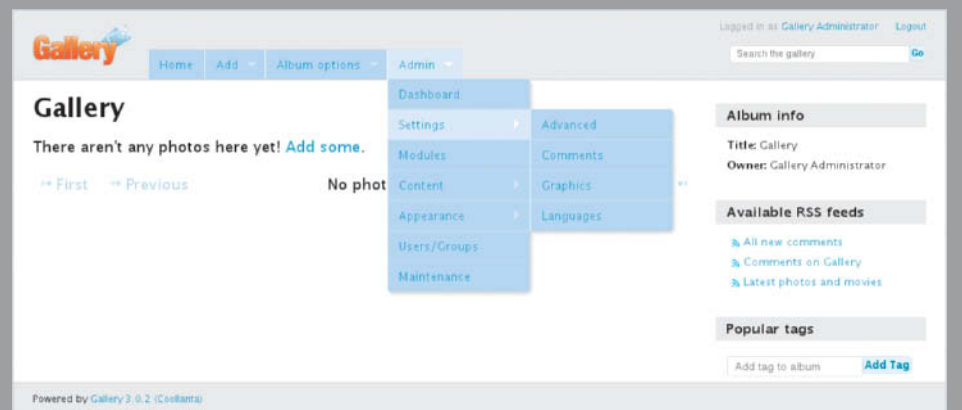
The rest of the setup process takes place within a browser and is the same for the Linux and Windows versions of the program. The URL for your installation will be either http://localhost/gallery3/ if you are hosting locally or http://my_domain.com/gallery3 if you are using a third-party provider. The installer will now check whether all the required PHP modules are present. This is automatically true if you used XAMPP, but can produce surprises for some Linux distros. Install the missing module (in our case, php-iconv) using your system's package management tool and use the *Check Again* option to make sure that you have installed all the required modules.

The installer will now ask you to enter the name of your database and the name of the new user you have created. Click Continue to complete the installation and check the user's name and password.

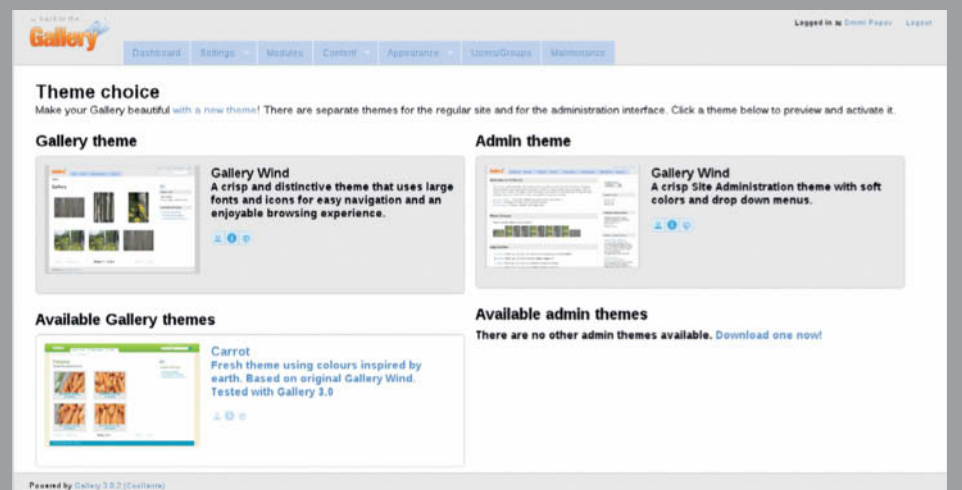
Before you populate *Gallery* with photos, there are a few administrative tasks to take care of. First off, you might want to replace the stock theme with something more distinctive. To do this, grab the theme you like from the official theme repository (codex.gallery2.org/Category:Gallery_3:Themes), unpack the downloaded archive and move the resulting directory to the Themes folder in your *Gallery* installation. On the *Gallery* main page, navigate to Admin > Appearance > Theme choice, where you should be able to see the newly-added theme in the 'Available Gallery themes' section. Click on a theme to preview it and click the activation link to enable it. You can then tweak the theme's settings in the Admin > Appearance > Theme options section, where you can specify the number of photos per page and thumbnail size, as well as header and footer text. The latter option can come in handy if you want to add a copyright notice or replace the default Gallery logo with custom text or graphics.

Although Gallery uses English by default, registered users can choose from a wide range of interface languages. Additional languages are enabled in the Admin > Settings >

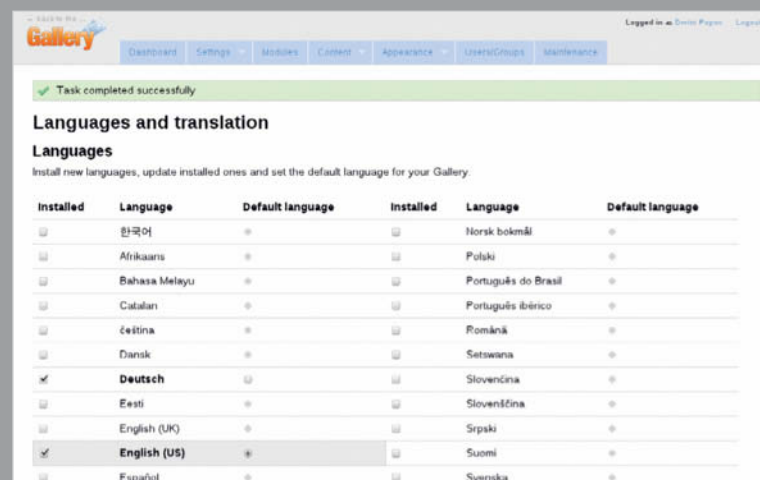
Setting up the Interface



The Admin tab includes all the basic user, user group, plug-in, interface, maintenance and language settings



You can customize *Gallery's* appearance by installing an alternative theme, and the official theme repository contains dozens of themes to choose from



Gallery supports a wide range of languages. You can install as many languages as you need and specify a default language for each user on your system

Basic Settings

Gallery can handle multiple users, and adding a user to the system is a simple matter of providing some basic information. To keep tabs on users and their access rights, you can organize them into groups.

Gallery features a built-in upload tool. Once photos have been added to your collection, you can group them into albums.

	Everybody	Registered Users	digiKam Users
View	passive allowed icon	passive allowed icon	passive allowed icon
View full size	passive allowed icon	passive allowed icon	passive allowed icon
Edit	inactive allowed icon	inactive allowed icon	passive allowed icon
Add	inactive allowed icon	inactive allowed icon	passive allowed icon

You can specify access rights for each album and existing user groups in the Edit Permissions dialog window

Maintenance

Occasionally your Gallery will require some maintenance. Here are some tasks you can use to keep it running smoothly.

Name	Description	Action
Update Search Index	Search data is up-to-date	run
Clean up tags	Correct tag counts and remove tags with no items	run
Extract Exif data	Exif data is up-to-date	run
Synchronise with Amazon S3	Synchronise your Gallery 3 data/images with your Amazon S3 bucket	run
Regenerate AWS S3 internal file hashes	Use this to regenerate file hashes in the database, resolves some conflict problems	run
Rebuild Images	All your photos are up to date	run
Update translations	Download new and updated translated strings	run
Remove old files	Remove expired files from the logs and tmp directory	run
Fix your Gallery	Fix a variety of problems that might cause your Gallery to act strangely. Requires maintenance mode	run

Finished tasks

Last updated	Name	Status	Info	Owner	Action
2011-Sep-21 13:59:11	Fix your Gallery	Success	48 / 48 operations complete	dmpop	remove view log
2011-Sep-21 13:59:05	Remove old files	Success	Removed: 0 files. Total: 0.	dmpop	remove view log
2011-Sep-20 15:33:53	Extract Exif data	Success	10 records updated, index is 100% up-to-date	dmpop	remove view log

Gallery provides a simple and intuitive interface for performing routine maintenance tasks such as rebuilding the search index, updating Exif data and fixing common problems

Languages options. Mark the languages you require and press the 'Add languages' button to install them. You can also change the default language by clicking the 'Default language' radio button next to your chosen language.

As with many commercial photo publishing solutions, Gallery can handle multiple users and enables you to organize them into groups. Furthermore, the application allows you to specify individual privileges for each group, giving you a flexible mechanism for controlling access to your photo collection. To add a user, navigate to the Admin > Users/Groups options and click the 'Add a new user' button. In the 'Add user' dialog window you have to specify a user name, full name, password, e-mail address and the preferred interface language. If you want to give the user administrative rights tick the 'Admin' check box, then click the 'Modify user' button to complete the process and close the dialog. To create a new group of users, simply click the 'Add a new group' button, give the new group a name, and hit 'Add group'. You can then add users to the group by dragging and dropping entries from the Users list.

Gallery comes with a handful of modules enabled by default, and you can further extend the application's functionality by activating other bundled modules. To do this, navigate to the Admin > Modules options, select the modules you want to activate and click the 'Update' button. The modules you select will depend on your specific needs, but some that are generally useful include the Akismet module, which protects comments from spam, Exif data, which displays Exif metadata for the current photo and the REST API module, which allows external applications to interact with Gallery.

Working with Gallery

There are other actions you can perform using the Admin options, but at this stage you are ready to put your new *Gallery* installation to some practical use. The first step is to populate the system with photos and group them into albums using the commands included in the Add tab. *Gallery* has its own built-in photo upload tool which can be found under Add > Add photos. Once you have uploaded one or more images, you can alter each photo's basic info by hovering over it with the mouse and clicking on the 'Edit this photo' command in the Options menu that then appears at the bottom of the frame. You can then specify a title and add a brief description and tags. *Gallery* automatically recognizes and displays tags that you have added using other programs.

If you receive a warning message that requests you to deactivate the PHP Suhosin security option (which is activated by default in most Linux distros), you have to add the following line to the `/etc/php.ini` file:

```
suhosin.session.encrypt = Off
```

To keep your photos organized, *Gallery* includes options for grouping them into albums. To create an album, choose 'Add an album' from the Add menu in the root album, enter the required information and click Create. Albums can contain multiple sub-albums, so you don't have to just pile all of your photos into a single collection. For example, you might want to create an album for your travel photos and then create sub-albums for individual countries. You can drag photos between albums in the Album options > Organize album view. Album options > Edit Permissions allows you to adjust individual access rights for each album and user group.

Gallery puts all essential image viewing features at your fingertips. Clicking a photo displays it at high resolution in a pop-up window, and the Photo Info panel in the right-hand sidebar displays any data stored

Adding Shopping Modules

The screenshot shows the 'Amazon S3 Settings' configuration page in the Gallery Admin interface. The page has a navigation menu at the top with options like Dashboard, Settings, Modules, Content, Appearance, Users/Groups, and Maintenance. A green status bar at the top indicates 'Settings have been saved'. The main content area is titled 'Amazon S3' and includes a note about Amazon S3 being a lightning fast Content Delivery Network. Below this, there are several configuration sections: 'Amazon S3 Settings' with checkboxes for 'S3 enabled' and 'Use SSL for S3 transfers', and 'CDN Settings' with a 'URL String' field and a 'Private Content Signature Duration' dropdown. The page also includes a 'Logout' link in the top right corner.

The Amazon S3 module allows you to use the Amazon Simple Storage Service as a content distribution network. This can help to lighten the load on your server and improve the performance of your *Gallery* installation.

The screenshot shows the 'Product Lines' configuration page in the Gallery Admin interface. The page has a navigation menu at the top with options like Dashboard, Settings, Modules, Content, Appearance, Users/Groups, Basket, and Maintenance. A green status bar at the top indicates 'Settings have been saved'. The main content area is titled 'Product Lines' and includes a table with columns for Name, Cost, Description, Postage Band, and Actions. Below the table, there are input fields for Name, Cost, Description, and Postage Band, and a 'Modify Product' button. The page also includes a 'Logout' link in the top right corner.

Name	Cost	Description	Postage Band	Actions
4x6	\$5.00	4"x6" print	No Postage	edit delete
8x10	\$25.00	8"x10" print	No Postage	edit delete
8x12	\$30.00	8"x12" print	No Postage	edit delete

The Basket module adds a PayPal-based shopping cart, allowing you to sell prints of your photos

with the image. If you have activated the Exif data module, you can display the photo's metadata by clicking the 'View more information' button. The Slideshow feature does exactly what it says and displays the photos in the current album as a slick slideshow. You can allow visitors to comment on your photos by selecting 'Everybody' from the Permissions drop-down list in the Admin > Settings > Comments section of the options window, and you can view or delete comments and remove spam in the Admin > Content > Comments section.

Hosting your own photo publishing solution requires regular maintenance to keep everything running smoothly and Gallery makes it simple to perform basic maintenance tasks. Switch to the Admin > Maintenance section to perform housekeeping actions such as updating the search index, rebuilding images, removing old files and fixing the installation if it misbehaves.

Extending Functionality

One of the major advantages of hosting your own photo publishing solution using Gallery is the ability to extend the program's default functionality using additional modules. As previously mentioned, Gallery comes with a handful of default modules that you can enable or disable at will, but the official list of available modules (codex.gallery2.org/

Category:Gallery_3:Modules) features dozens of other useful extensions which can add really nifty functionality to your Gallery installation. For example, the Amazon S3 module uses the Amazon Simple Storage Service (S3) as the CDN (content distribution network) back end for your installation, allowing you to lighten the load on your server and significantly improve the performance of your Gallery system. The Amazon S3 service is not free, but offers reasonable pricing based on the amount of storage and data transfers you use (see aws.amazon.com/s3/pricing/), and you have to sign up for the service before you can integrate it into your Gallery installation. To set up S3, navigate to Admin > Modules, select the Amazon S3 module, and click the Update button. Next, switch to the Settings > Amazon S3 section to configure it. Most of the options contain brief explanations to help you configure them. Remember to tick the 'S3 Enabled' check box before you press the 'Save Settings' button.

Installing Amazon S3 or any other Gallery module is a simple matter of fetching the latest version, unpacking the downloaded archive and moving the resulting folder to Gallery's Modules directory.

Using the Basket Module

This module (available at codex.gallery2.org/Gallery3:Modules:basket) adds shopping

cart functionality to your Gallery installation. This allows you to sell prints of your photos and process payments via PayPal. Once installed, the module adds a dedicated Basket tab in the administration interface. The module's basic settings (currency, PayPal e-mail address etc.) are made in the Basket > Configure options section, and you can also define custom postage rates using the Basket > Postage Bands options. The Basket > Product Lines section is used for editing existing purchasing options and adding new ones. And that's all there is to it – now all visitors to your site can buy prints directly.





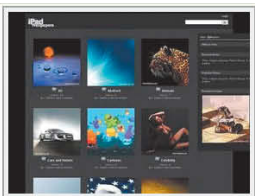
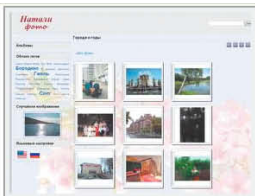
Conclusions

Hosting your own photo publishing solution takes time and requires good technical chops, but the benefits are numerous and often outweigh the potential drawbacks. But remember, photo hosting is not an 'either/or' proposition – If you prefer to use photo sharing services like Flickr, SmugMug or 500px to showcase your photographic work you are free to do so, while an additional Gallery-based solution can serve a variety of purposes, from a fallback option to a private collection of your best shots that you only share with a specific group of people. (jr)

Gallery 3 Demo Sites

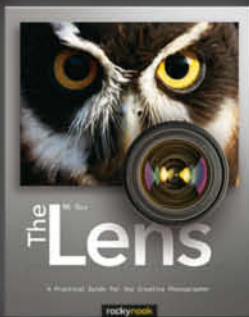
Submit your own site!

Note: we are not responsible for the content of these external sites. You must be logged in to add ratings.

 <p>www.fokkografie.nl Website with lots of photo's of one particular Photographer. ★ ★ ★ ★ ★ 4 votes</p>	 <p>www.7hotkoreangirls.info Korean girls photo gallery ★ ★ ★ ★ ★ 197 votes</p>	 <p>www.yuenjun.com The Largest Japanese Beauty Women Wallpaper Gallery Site ★ ★ ★ ★ ★ 113 votes</p>
 <p>cars-pictures.net Cars Pictures Gallery ★ ★ ★ ★ ★ 104 votes</p>	 <p>ipad-websites.net Best iPad Wallpapers ★ ★ ★ ★ ★ 92 votes</p>	 <p>rikovafoto.ru NonStandart greydragon theme ★ ★ ★ ★ ★ 6 votes</p>

The Gallery website includes a page for submitting your own gallery design and rating those of others



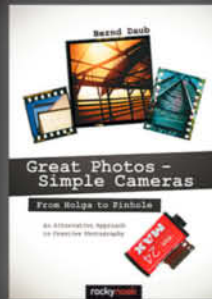


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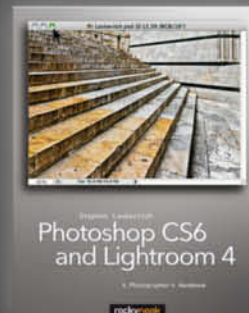


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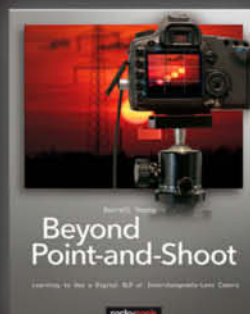


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André Kramer

HD Slideshow Software

for high-end home entertainment

Many living rooms these days play host to HD TVs of a size and resolution that make them perfect for presenting photos, while the latest slideshow programs offer Full HD resolution as well as a wide range of creative effects and text options. This article takes a look at some of the programs on today's market and gives you the lowdown on some of the great (and not-so-great) features they offer.

Presenting photos of your vacation or your kids' progress on a TV screen gives everyone the opportunity to participate in your adventures, but dividing them up into chapters with cool transitions and a musical soundtrack transforms everyday snaps into a real story.

Many people have an LCD TV or projector with Full HD resolution at home, and these are much better suited to presenting slideshows than their CRT predecessors. Expressed in 'photo-speak', a CRT resolves about two megapixels, while modern and legacy digital compacts are capable of resolving more than five megapixels, even when a clip has been cropped to 16:9 format. Standard DVD Video has an equivalent resolution of about 0.4 megapixels, which represents a significant loss of quality when compared to the original material. If you own an output device such as a Playstation 3, you can play back Blu-ray discs or video encoded in AVCHD (Advanced Video Codec High Definition) format. Both standards can play footage recorded at Full HD resolution, and AVCHD can even burn Full HD to DVD if it is encoded using H.264 compression. Alternatively, high-resolution video files also perform the same job.

We took a look at a range of contemporary slideshow applications and how they can be used to apply captions, dissolve effects, audio

soundtracks and digital zooms and pans to bring your images to life on an HD screen.

We tested Aquasoft *SlideShow Blue Net 7*, Corel *Digital Studio 2010*, Magix *PhotoStory on DVD MX*, Cyberlink *MediaShow 5* and *Photo DVD Maker 8* by Anvsoft. On the Mac side, we checked out Boinx *FotoMagico 3 Pro*.

Only *SlideShow Blue Net* and *PhotoStory on DVD* can burn Blu-ray discs. *Digital Studio* burns AVCHD, and all the others output high-resolution video files. Our test candidates also offer a range of other output formats including Flash clips for Web presentation, YouTube upload and slideshows for mobile devices such as the iPhone, iPod touch, iPad and Playstation Portable (PSP).

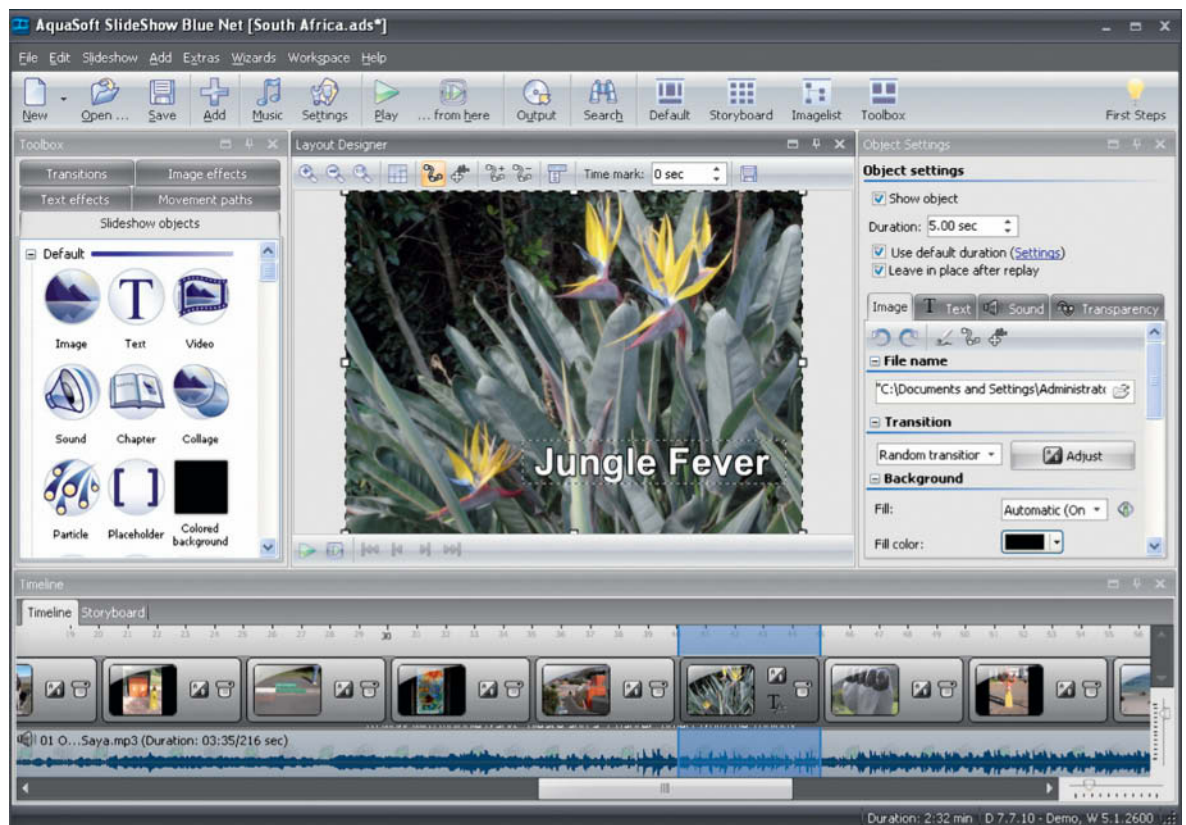
Deliberate understatement is an important part of any slideshow, and you need to make sure that transition effects, text boxes and pans don't dominate the images. Although it is an advantage to be able to create effects manually, it is also handy if your program is capable of producing a slideshow largely automatically. Even if you prefer to retain complete control of the effects you use, it is a boon if you can simply alter a single pan independently of the rest of your slideshow, rather than having to adjust the keyframing for all 200 photos in a sequence. Most busy families want to turn simple themes into an

appealing photo show, and are quite happy to do without over-the-top scenes with exploding snowmen on skis or rose petals raining down on wedding rings.

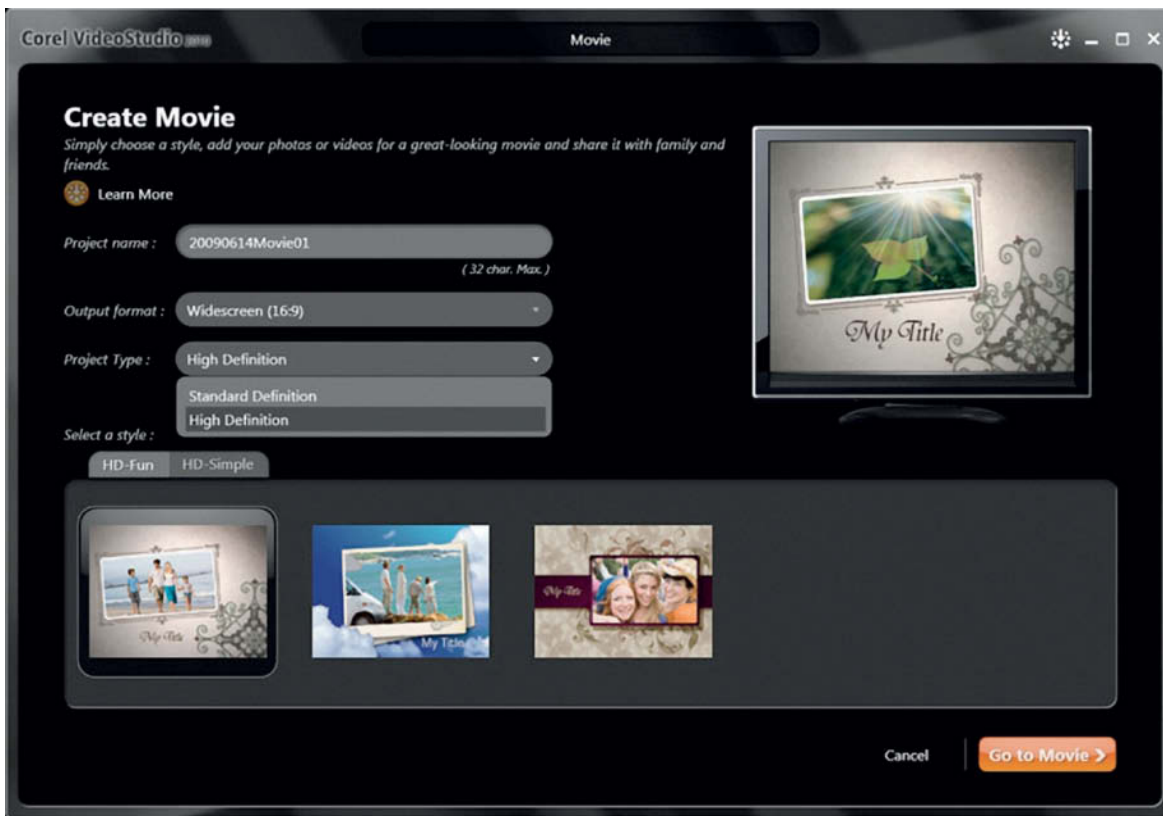
SlideShow 7 Blue Net

Aquasoft *SlideShow* gives its users a lot of creative tools to play with, but provides wizards for simple slideshow creation too. The comic-style clip art and animations provided with the program are mostly too garish for everyday use. The Slideshow Settings dialog (in the Slideshow menu) is used to select the default display duration for each image and also includes a choice of standard transitions. You can choose whether to display your images at full size with a black border, cropped to fit a selected aspect ratio or distorted to fit your chosen format. The various Ken Burns effect presets included in the Movement Paths tab in the Toolbox can be applied globally to all images if you want. The transparency effects are based on curves and markers just like the ones found in pro-grade programs like Adobe *After Effects*.

Typed text appears by default in white with an optional shadow, and there are many text effects (some animated) that you can add to your captions and speech bubbles. The



SlideShow 7 Blue Net by Aquasoft, with its multi-track timeline and animated transparency effects, offers a wide range of creative options



Corel's *Digital Studio 2010* has a simple interface with a range of options aimed squarely at slideshow beginners and less experienced users

preset 'particle' effects (such as rain or snow) are very effective. The icons for the text and transition effects in the Toolbox tabs are also animated previews, which makes it much easier to choose which one to use. All tools are applied by dragging them to the timeline, which is hierarchically constructed and contains multiple tracks.

The program is well equipped in the export department, and can even burn slideshows to Blu-ray disc and AVCHD for playback on a Playstation 3. Exported AVCHD material showed slight jerkiness, while Blu-ray sequences were fluid and extremely sharp. You can burn multiple slideshows to a single DVD and there is a range of options for adding menus.

The program can also export high-resolution clips in MP4, M2TS, MKV and WMV formats, to name just a few of the options on offer. It writes files with either 720 or 1080 lines of resolution and remained stable while using all four cores on our test machine for its authoring run. The program also includes options for export to a wide range of mobile phone, Playstation Portable and iPod models (including older versions), but doesn't yet support the latest iOS and Android releases.

The *Premium* version (US\$40) can create neither DVD menus nor HD files, whereas the *Ultimate* version (US\$70) can. Only the

top-of-the-range *Blue Net* version (US\$90) supports Blu-ray authoring and other advanced output formats.

Digital Studio 2010

Corel *Digital Studio* is something of a Jack-of-all-trades and is aimed at beginners and less experienced users. It can be used to manage and edit still images and videos and has *WinDVD 2010* built in. Once you have imported your data, you can choose to have calendars, prints, greeting cards etc. made, or you can create a slideshow.

Double clicking an image opens a window with basic editing tools, including cropping, straightening, red-eye removal and color correction. There are also simple additional tools (click the 'More Tools' button) for creating and editing artistic effects and frames.

The slideshow module includes settings for aspect ratio and high or low resolution, and offers a selection of nine preset templates. Five of these include animated start and finish images, while the other four have no real graphic elements to speak of. Here too, the program is quite sparing with the number of options it offers. You can add a soundtrack or record memos, and there are options for adding captions and transitions.

We found ourselves wishing for less simplicity and more choice in various places – for example, we would like to have seen a standard 'Save' dialog rather than the list of folder names (without paths) that the program uses, or more information about the type of DVD you are about to burn. All of the interesting features are hidden away in pop-up menus at the side of the window, and without them you are flying blind.

The program can burn high-resolution AVCHD discs that we were able to play on our Playstation 3, although the animated start and finish sequences were slightly jerky. In Full HD MPEG mode, the program produced smooth pans and subtle fades. Our attempt to export a sample project as a 720×576-pixel AVI or WMV file unfortunately produced a file that showed the original 4:3 crop distorted to fit the 16:9 Full HD frame.

FotoMagico 3

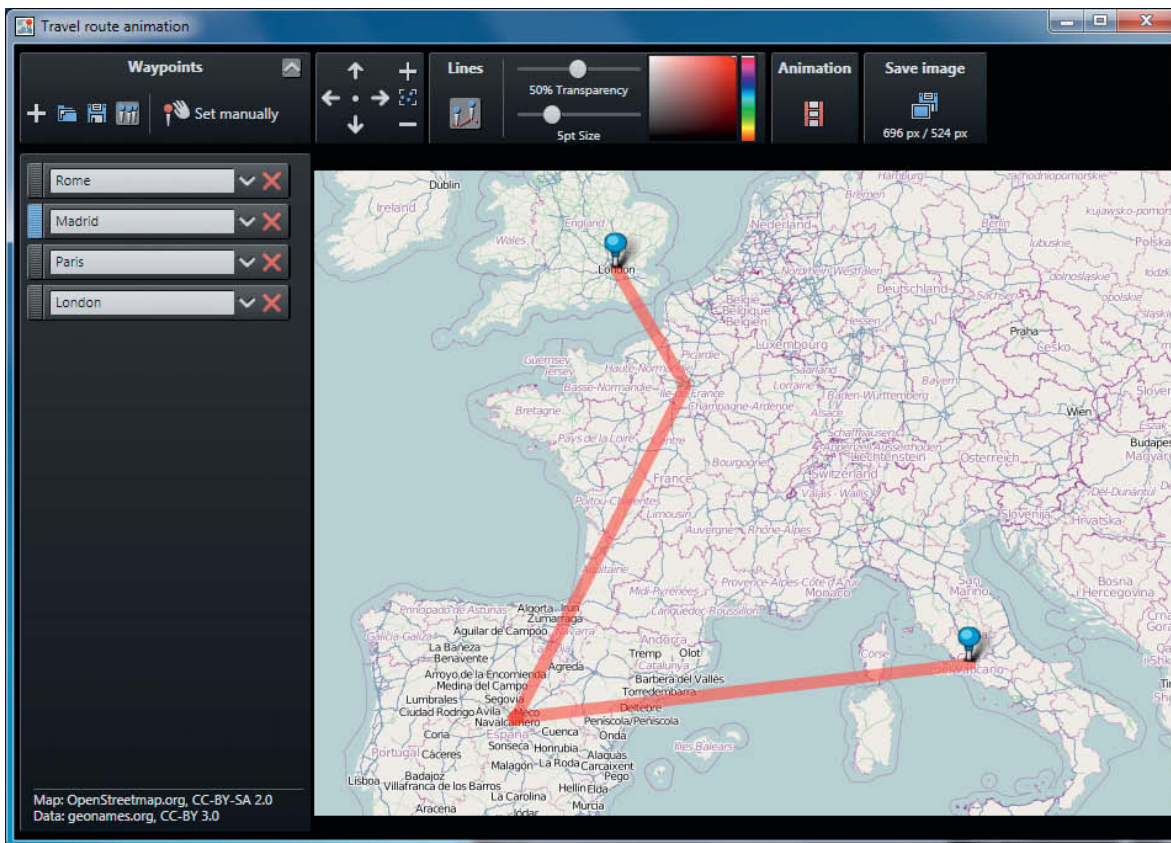
The *FotoMagico* interface is as user-friendly as most Mac users will expect. You have to choose between monitor, television or projector output and select your screen type and resolution at startup. The resulting project is then automatically given the correct aspect ratio and resolution settings. You can load images from *iPhoto*, *Aperture* and *Lightroom* libraries or directly from user-specified folders.



Boinx FotoMagico 3 includes intuitive tools for selecting start and finish points for digital pans and zooms



Magix PhotoStory on DVD MX can be used to create eye-catching movie-style 'trailers' to grab viewers' attention before the real show begins



Animated travel routes enhance slideshows created using *PhotoStory on DVD*

The interface includes tracks for music, effects and commentary, and has its own built-in sound recorder.

The software creates subtle Ken Burns effects automatically, but you can set the start and finish points manually too, using the twin preview windows together with the Zoom and Rotation dials.

The Options panel includes settings for display duration and image animation (if desired). There is also a small slider panel that allows you to set fade curves and a teleprompter that you can display on a second monitor during live presentations.

Finished slideshows can be exported as a standalone player, as a screensaver for OS X, via iDVD or Toast as a video DVD, or as a high-resolution HD file for playback on YouTube, an iPod or the iPhone. You can also select custom resolution settings for export to MOV and MP4 formats. The default video codec is H.264 with AAC audio, and you can change both settings if you want. The results are great – slideshows play back smoothly and have no unsightly black borders. The range of available formats is up to date, and the only real drawback is the lack of a burn functionality. The cheaper Home version (US\$29.99) cannot export to MOV or MP4 formats – in other words, it is not HD-compatible.

PhotoStory on DVD MX Deluxe

This package is great for both skilled creative artists and quick-clicking photo fans. The Photoshow Maker wizard enables you to create a slideshow, complete with effects, using just a few mouse clicks. The program automatically divides non-RAW photos more or less logically into chapters using each file's Exif metadata as a guide, but you can create chapters manually too if you want. Some of the program's built-in templates ('Chill Out' or 'Light Box', for example) provide subtle background music and fades, while others ('70s Party' or 'Love Story') are simply too kitschy for general use. We would have preferred to see less quantity and more quality as far as the templates and transition presets are concerned.

Fades, effects, text and two music tracks can be arranged manually in the timeline, while the wide range of text effects includes rotation and multi-directional movement as well as 3D. You can also create Hollywood-style rolling titles, subtitles and news-style text inserts.

One of the program's highlights is a wizard for creating animated travel routes using online maps. All you have to do is select your destinations – the program then automatically generates a route connected by

pins on the map. If it is not clear exactly which location you mean, the program suggests alternatives. Routes can be saved as still images or WMV files with animated car, boat, airplane or bicycle icons. Unfortunately, these tend to flicker somewhat.

A new wizard includes 15 templates for creating Hollywood-style film trailers. The choice of themes includes adventure, action, blockbuster, drama, love story and thriller. Here, the program requires you to load not just any old image sequence, but rather one that contains wide shots, detail shots, close-ups, shots that include movement and group photos. There are pictograms to help you choose which photos are best suited to each category. Finished trailers are enhanced with clichéd music (although you can also select your own) and appropriate animations. You can add text too if you want. These trailers make great eye-catchers that grab a viewer's attention before the real show starts.

The program is one of the few we tested that can burn slideshows to Blu-ray discs, although it did crash once or twice while burning full-length shows. You can also burn about 20 minutes of Blu-ray material onto writeable DVDs – a process that didn't produce any crashes during our test. Our Playstation 3 couldn't detect the menus on

SLIDESHOW SOFTWARE						
Product	SlideShow 7 Blue Net	Digital Studio 2010	FotoMagico 3.8 Pro	PhotoStory on DVD MX	MediaShow 5	Photo DVD Maker 8.0
Manufacturer	Aquasoft	Corel	Boinx	Magix	Cyberlink	Anvsoft
URL	www.aquasoft.net	www.corel.com	www.boinx.com	www.magix.net	www.cyberlink.com	www.anvsoft.com
System support	Windows XP/Vista/7	Windows XP/Vista/7	Mac OS X (10.5 and up), QuickTime 7.1	Windows XP/Vista/7	Windows XP/Vista/7	Windows XP/Vista/7
Import						
Photo	BMP, JPEG, JPEG 2000, PNG, PSD, TIF	BMP, JPEG, JPEG2000, PNG, TIFF, various RAW	BMP, JPEG, JPEG2000, PNG, PSD, TIFF, RAW ¹	BMP, JPEG, PNG, PSD, TIF, various RAW	BMP, JPEG, PNG	BMP, JPEG, PNG, TIFF
Video	AVI, MPEG, MOV, MP4 (AVC), WMV	AVI, MOV, MPEG-2, WMV	MOV, MP4 (AVC)	AVI, MPEG-2, WMV	AVI, MOV, MPEG-2, WMV	–
Audio	MP3, Ogg Vorbis, WAV, WMA	MP3, M4A, Ogg Vorbis, WAV, WMA	AIFF, M4A, MP3, WMA, WAV	MP3, Ogg Vorbis, WAV	MP3, WMA	MP3, WAV, WMA
Export						
Video DVD / mini DVD	✓ / ✓	✓ / –	✓ (via iDVD or Toast) / –	✓ / ✓	✓ / –	✓ / ✓
Blu-ray / AVCHD	✓ / ✓	– / ✓	– / – (no burn tool)	✓ (mini Blu-ray) / ✓ ²	– / –	✓ (file only) / –
Adjustable bit rate: Audio / Video	✓ / ✓ ()	– / ✓ (3 increments)	– / – (no burn tool)	✓ / ✓	– / ✓ (3 increments)	– / –
Project backup / Multi-session	✓ 'Archive' / –	– / –	– / – (no burn tool)	✓ / ✓	– / –	✓ (and others) / –
Video file formats	AVI, MPEG-2, MOV, MP4, M2TS, MKV, WMV	AVI, MPEG-2, MP4 (AVC), MOV	MP4 (AVC), MOV	MP4 (AVC), WMV	MPEG-2, MP4 (AVC), WMV	AVI, FLV, MPEG-2, MP4 (AVC)
Maximum resolution	1920 × 1080 (AVI, M2TS, MKV), 2048 × 1536 (WMV)	1920 × 1080 (MPEG, H.264), 1440 × 1080 (WMV), 720 × 576 (AVI)	1920 × 1080	400 × 300 to 1280 × 720 Pixel, 25/30 Frames (MP4)	1920 × 1080 (MPEG-2, M2TS AVC), 1280 × 720 (WMV)	1920 × 1080 (MKV, MP4 AVC), 720 × 576 (MPEG-2), 352 × 288 (FLV)
Device profiles	iPod, PSP, various mobile phone profiles	iPhone, iPod, PSP, standard mobile phones	iPhone, iPod, Apple TV	Profiles for iPhone, iPod, PSP, PS3, Zune and many mobile phones available online	iPhone, iPod, PSP, Zune, PS3, Xbox	iPhone, iPod, PSP, some mobile phones
Menu templates: DVD / HD	66 / 66	5 / 5	–	26 / 14	11 / –	15 (82 more online) / –
Upload	YouTube	Facebook, Flickr, YouTube	YouTube	Magix Online Photo Album	Facebook, YouTube	– (creates YouTube, Myspace files)
Tools						
Styles / Themes	19 (4:3 and 16:9)	9 (same as in DVD menu)	– ('Instant Slideshow')	26	14	75 (or transition subset)
Aspect ratio / Automatic crop	4:0, 16:9 / ✓	4:0, 16:9 / ✓	4:0, 3:2 / –	4:0, 16:9 / ✓ (or Shift+A)	4:0, 16:9 / ✓	4:0, 16:9 / ✓
Image editing	Automatic exposure, contrast, color and histogram correction	Crop, straighten, red-eye, brightness, contrast, color	–	Brightness, color, sharpness	Crop, red-eye, brightness, contrast, color	Sliders for color and brightness, channel mixer
Timeline / Storyboard	✓ / ✓	– / ✓	✓ / –	✓ / ✓	– / ✓	– / –
Text tools / Rolling titles / Subtitles	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / – / –	✓ / ✓ / ✓ (3D titles, news-style inserts)	✓ / – / –	✓ / – / ✓ (Auto text fill with file, folder name etc.)
Fade effects	More than 150	8	16	109 4:0, 32 (16:9)	32	More than 300
Motion effects	17 Ken Burns effect presets	Automatic Ken Burns effect	Manual and automatic Ken Burns effect	Ken Burns effect, rotate, motion, distortion	Ken Burns effect ('Motion')	Automatic or manual
Photo effects	Torn, sticky tape, grid, Polaroid	Black and white, sepia, antique, various frames	–	Mosaic, sand, poster, emboss, fisheye, color shift	Black and white, sepia, vignette, glow	–
Other modules	Particle and text effects, animated paths for images and text	WinDVD, Paint Shop Photo, VideoStudio, calendar and photo books can be ordered online	–	Animated travel routes, photo manager	Library with face recognition, video converter	Audio, CD ripper
Ratings						
Interface / Handling	⊕⊕	○	⊕	⊕⊕	⊕	⊕⊕
Slideshow quality	⊕	⊕	⊕	⊕⊕	⊕	⊕
Stability and speed	⊕	⊕	⊕⊕	○	⊕	⊕⊕
Price (approx. US\$)	90	40	140 ('Home' version 30)	70	45	50
¹ Plus iPhoto, Aperture and Lightroom libraries ² Requires MP4 codec which costs US\$10						
⊕⊕ excellent ⊕ good ○ satisfactory ⊕ poor ⊕⊕ inadequate ✓ included – not included						

our mini Blu-ray disc but did manage to play the MPEG streams without any problems, while a Philips Blu-ray player interpreted the entire disc correctly. Although we made several attempts, we were unable to successfully burn an AVCHD disc, but the program did produce flawless standalone HD slideshow files for playback on a computer. HD clips can also be exported as WMV files or directly to your YouTube page.

Cyberlink MediaShow 5

MediaShow is divided into four modules: Photos, Videos, Disc and Convert, with each covering a different stage of the slideshow production process. If you select the Photo module, you are presented with a library that you then fill with the images and videos you want to present. The program interface is in photo-friendly black and includes a face

recognition module to help you tag your photos. Tags are added to your files once you have uploaded them to Facebook or Flickr.

The style, transition effects and display duration of a slideshow are selected in the slideshow editor, and the currently selected photo is displayed in a large preview window. Videos are not previewed in the same window, but clicking the 'Play' button switches from the still preview to the video



Cyberlink *MediaShow*, with its limited range of user-controllable options, can be used to quickly create highly appealing slideshows

window. Most of the transition effects are usable but, unfortunately, the pretty dice effect that the program itself uses to switch between modules is not among them.

Some of the styles are highly contemporary and work very well: for example, 'Motion' produces a subtle Ken Burns effect without the user having to intervene at all, while 'Cell' divides the frame

into nine parts and fades your photos in and out of them following a varying rhythm. The effect is dynamic but not kitschy. The available styles are generally attractive and low-key. The program doesn't offer colored backgrounds or clip art, but you can fine-tune brightness, contrast, saturation, white balance and sharpness for photos and videos. The export dialog is the same as the one you see

if you select the *Convert* option at startup, and contains resolution, format and codec options that cover various Apple, Microsoft and Sony devices as well as direct upload to YouTube. You can also select your own export format – for example H.264 in an M2TS container or a 1920×1080 MPEG file. In general, the program works smoothly and delivers good overall results.

Computer-based Photo Presentations

If your TV is already connected to your computer using an HDMI cable, you don't necessarily need to burn your slideshow to disc, as most image viewers also have some sort of built-in slideshow functionality. *IrfanView* simply displays your images in full-screen view without any effects at all, while *XnView* is capable of adding fade transitions. In both cases, each image is displayed for a preset duration or can be toggled using the computer keyboard.

FastStone Image Viewer displays images in full-screen mode, automatically inserts the file's creation date and offers more than 150 transition effects of varying quality. *Picasa* offers slide shows with transition and additional Ken Burns effects.

Photoshop Elements includes 23 different transition effects, text effects and background music, and saves slideshow files to WMV or PDF with a resolution of 1600×1200 pixels. *Lightroom* plays

photo collections as slideshows directly from the program interface and can also output them as high-resolution MP4 video files. Instead of flashy effects, *Lightroom* offers classy looking frame and identity plate effects.

Apple's *iPhoto '11* photo management package is part of the *iLife* suite and provides six preset slideshow themes that range from simple sequences to animated effects à la Ken Burns or stacks of Polaroid-style framed photos. There are also themes with antique and fast-moving collage effects. You can add music from your *iTunes* library and export slideshows as MP4 files for playback on the iPhone, an iPod or Apple TV. Apple's *Aperture 3* RAW converter includes a slideshow editor that enables you to add text, music and Ken Burns effects, with output in the form of HD MOV files.

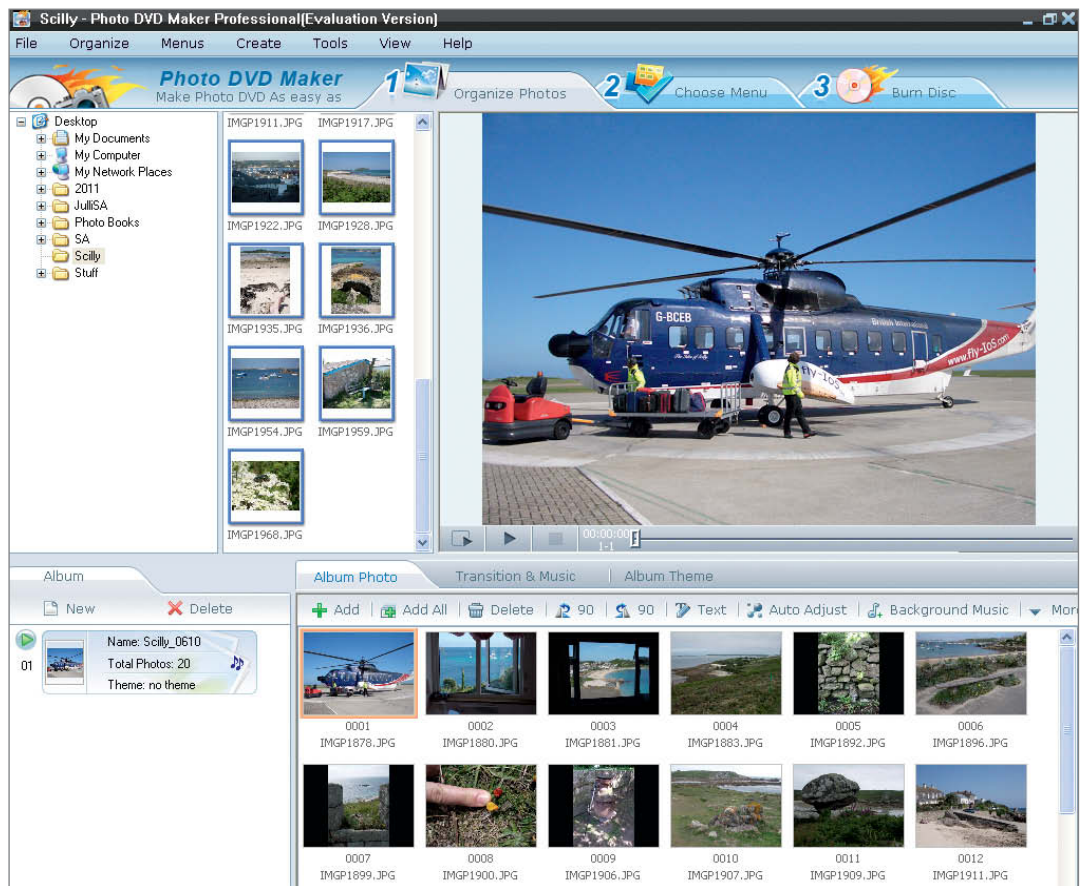


Photo DVD Maker is not particularly stable and includes a lot of fairly useless junk features

Just before we went to press, we received a beta of version 6, which can burn video clips and slideshows to Blu-ray and AVCHD. In our preview test, the motion and transition effects we applied weren't converted during export, leaving us with non-moving images in our video file and on disc.

Photo DVD Maker 8

Photo DVD Maker advertises export to Blu-ray-compatible file formats but initially attracts attention with its clumsily translated interface. The package also includes a CD ripper and a sound editor that consistently crashed the program when we tried to use it.

Slideshows are created in a default 4:3 format which automatically includes various effects. The default caption is the name of the current folder and the default typeface is Comic Sans – a font that is loved by visual arts amateurs and hated by professionals in equal measure. Text can be displayed in a number of bright, almost day-glo colors. Trying to find the right transition effect from the 300 or so supplied with the program is tricky to say the least – especially considering that you can only preview five at a time. There are 75

themes to choose from, although most of them are just frame effects that appear to compete with each other for some kind of ugliness prize. This 'quantity instead of quality' approach continues with an amazing collection of unusably kitschy DVD menu templates.

Once you have removed all of the default effects (except for the Ken Burns-style pans), you can save your project to various formats for a range of conventional devices or upload to YouTube. The software produces high-resolution MP4 files and muddy-looking MPEG-2 video clips. The range of export formats also includes Full HD MKV but, for the reasons outlined above, we do not recommend the program for everyday use.

Conclusions

It is hard to escape the feeling that slideshow software manufacturers simply don't pay much heed to quality programming. *Photo DVD Maker* is as good as useless, and Corel's *Digital Studio* – which is not exactly cheap – presented us with distorted aspect ratios right off the bat. The program is really aimed at family members who are not particularly interested in computers but who still want to

produce quick and easy slideshows. On the plus side, Corel gives you the option of burning your clips to high-resolution AVCHD disc.

FotoMagico has a refreshingly 'different' interface and genuinely useful features for making live, projector-based presentations. It also offers a good range of contemporary export formats. Cyberlink hasn't (yet) announced AVCHD or Blu-ray support for *MediaShow*, but still produces attractive slideshows in a range of useful video file formats

Aquasoft's *SlideShow* is a versatile program aimed at those who like tinkering with their slideshows and sharing tips, animations and menu templates with like-minded users in the manufacturer's extensive forum. At US\$90, the new *Blue Net* version is the most expensive of the three on offer, but shines with its unequalled range of export formats and AVCHD and Blu-ray burn support.

PhotoStory on DVD MX produced HD Blu-ray discs without any problems. The program offers a high-quality visual experience, and the 'film trailer' feature included with the latest version helps transform everyday slideshows into a real multimedia treat. (akr) **ct**

Coming up in Issue 9 ...

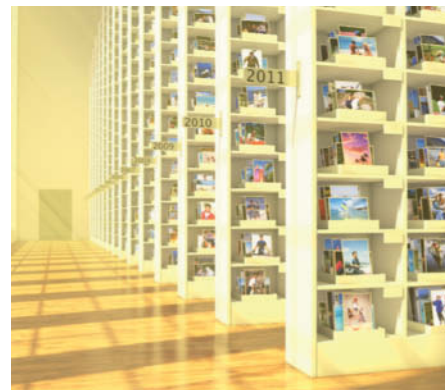


Combating Chromatic Aberrations

Chromatic aberrations and other lens errors were just as prevalent in analog times as they are today, but it is the development of digital image processing technology that has given us the tools we need to correct them effectively. We take a look at some of the specialized programs and plug-ins on offer and explain how you can use them to get rid of those irritating RAW and JPEG color smears.

Street Photography

Street photography illustrates public life in all its many facets. But don't be fooled: photographing strangers going about their daily business can be tricky, and it is easy to overstep the limits of everyday tolerance. We give you professional tips on how to approach people and how to go about unobtrusively capturing great spur-of-the-moment images.



Sorting and Managing your Photo Archives

An orderly folder structure alone is no longer sufficient for keeping track of large numbers of digital images. A well-thought-out system of keywords and ratings helps when you need to find the right photo. Database software that includes face recognition and geotagging functionality is the tool of choice for managing digital assets. We put some well-known and some less prominent tools through their paces.



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Issue 8

Published by

Heise Zeitschriften Verlag GmbH & Co. KG
P.O. Box 61 04 07, 30604 Hannover
Germany

In cooperation with

Rocky Nook, Inc.
802 East Cota St., 3rd Floor
Santa Barbara, CA 93103
U.S.A.

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81739 Munich

Germany

Subscription Service: For orders and all other issues please contact subs@ct-digiphoto.com

Subscription Price: An annual subscription (4 issues)

costs US\$49.95 (USA), £26.95 (UK), CAN\$49.95 (CA),

AUS\$43.95 (AUS), NZ\$56.95 (NZL), €39.95 (other)

Postage is included within Europe and the continental

USA, other terms may apply elsewhere.

Suggested Retail Price (single issue):

UK	£7.99	Australia	AU\$12.99
USA	US\$14.99	New Zealand	NZ\$16.90
Canada	CAN\$14.99		

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Heise Zeitschriften Verlag GmbH & Co. KG

Printed in Germany

by Dierichs Druck + Media GmbH & Co. KG, Kassel

Distributed in the USA and Canada by CMG,

155 Village Blvd., 3rd Floor, Princeton, NJ 08540

Distributed outside of the USA and Canada

by COMAG Specialist, Tavistock Road, West Drayton,

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