

Free DVD  
inside

Anti-shake Special • Photoblogs • Full-frame Revolution • Blending Modes

# ct *Digital Photography*

The in-depth quarterly for the photo enthusiast

Anti-shake Special

**Body Control**  
and Shooting Techniques

**Stabilizer Hardware Test**

Creative Corner

**Monochrome Composition**

**Photoblogging** Made Easy

Image Processing

**Blending Mode** Techniques

**Open Source Editing**

**Standalone Selection Tools**

Free DVD

**Full Version Software**  
**Video Tutorials**

The End of Medium Format?

# Full-frame Revolution

Nikon/Hasselblad Shootout, Market Overview

10 (2013) • \$14.99  
Winter Issue



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When we journalists talk about a “Ferrari piece”, we mean an exciting article about a high-end product that people love to read about, but which only very few of our readers will ever buy. This issue contains just such a Ferrari article, and tells you all about the fight the US\$16,000 Hasselblad H4D-40 has on its hands now that Nikon has released the D800E, with its 36-megapixel full-frame sensor and US\$3,300 price tag. And I can tell you this much right now: today’s medium-format Ferraris could be in trouble. Multi-megapixel quality is now available in a full-frame package for a fraction of the cost, and might just signify the start of a revolution in the high-end digital camera market.

But back to the basics: what’s the maximum exposure time you can shoot without producing camera shake? Our expert tutorial, written by a skilled military marksman and photo enthusiast, gives you insider tips on how to keep your camera still in just about any situation. We explain the techniques you need to squeeze the longest possible exposure time out of every opportunity – all you have to do is practice.

And why not publish the results of all your efforts in a photoblog? Increasing numbers of photographers present their work online, and a blog is a personal and versatile alternative to a conventional Web gallery. Our workshop provides a step-by-step guide to the open source WordPress blogging platform, showing you how to create your own photoblog and display your portfolio to its best advantage. We also introduce some additional plug-ins and tell you how to use custom themes to give your blog its own unique look. It’s easier than you might think, so why not give it a try?

Have fun with Issue 10 – we hope you are as excited as we are that we’ve reached double figures!



Juergen Rink





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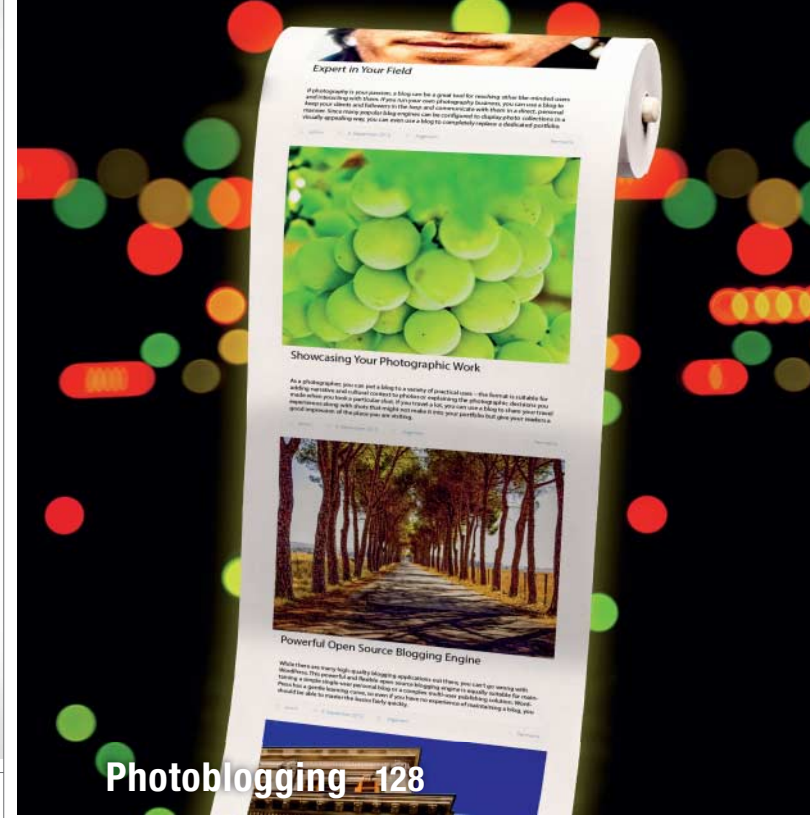
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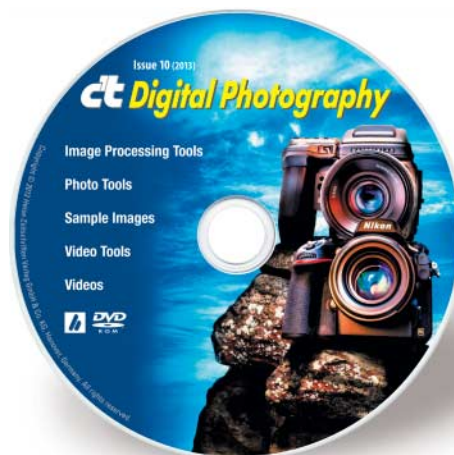
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#### DVD Download

An image of the free DVD provided with the magazine is available for download at [www.ct-digiphoto.com/dvd102013](http://www.ct-digiphoto.com/dvd102013)

# Readers' Letters



## iPad Only?

I just received an email from Customer Service about the *c't Digital Photography* iPad app. Your articles are more thorough than any other publication, so something like this is extremely important. That said, by making it for iPad only, I, and many others, are left out. Either PDF issues, or an HTML 5 app, would have worked for all modern computers. Will there be an option for non-iPad users? I currently use Windows, Linux, and Android devices.

Paul Danger Kile

*Never fear! There is also a zinio edition of each issue that includes the option to download our free DVD content too. See our subscriptions page at [www.ct-digiphoto.com](http://www.ct-digiphoto.com) or check out [www.zinio.com](http://www.zinio.com).*

## Best Periodical in Print

Thank you for the color management articles in issue 8. This type of in-depth and well written information is why I subscribe and consider *c't Digital Photography* to be the best photography periodical in print.

Richard

## Sets Standards

First of all thanks for your dedication and that of the editor for coming back with such a well thought out reply. It shows you take your readers seriously and I can't even begin to say how important that is to me. As a long time subscriber to *c't computermagazin* and a new

subscriber to *c't Digital Photography* I can only applaud you for doing that.

I'd like to add that I really look forward to every new issue of both magazines and the photography edition has set a standard others could only dream of. I'm particularly happy with the way you take open-source and Linux as seriously as any other OS out there. As an experienced Windows and Linux user I feel I'm getting the best of both worlds although it may seem sometimes I have a knack of being somewhat overly protective of Linux – it is, in the end of things, nearer and dearer to my heart.

Keep up the good work and I'll try to keep up good and fair comments and dialog!

Mike Bing



## Excellent Camera Test

The high-end camera test is excellent. It is a great comparison with plenty of detail. If I were thinking about purchasing a semi-pro or pro camera, I would want to read this article first!

Darrell Young  
(via Facebook)

## Photographic Journal Worthy of its Title

My sincere congratulations on an excellent magazine. At last, I have found a photographic journal worthy of its title.

Julian Ashbourn

## Beyond All My Expectations

I've received my very first issue of *c't Digital Photography*, and it was beyond all my expectations for a photography magazine. This is by far the best photography magazine I have ever read. I read the entire issue, cover to cover, while flying from California to Texas. Now here's the problem, what am I supposed to do while you guys are getting the next issue ready for publication? I guess I am going to have to pace myself with your future issues, a little bit at a time, savor every word in every article.

Every single article was at the right level, it wasn't too basic and it wasn't too advanced, each one was perfect for me. I must say my favorite article, which I've read multiple times, highlighting and annotating the article, was 'Street Photography'. I have never read an article or book about street photography which has the breadth and depth this one has and I love the writing style. I must commend the author, Meike Fischer, a job well done! If there is a book in the works, I will be one of the first to buy it. Thanks for your time and keep up the good work.

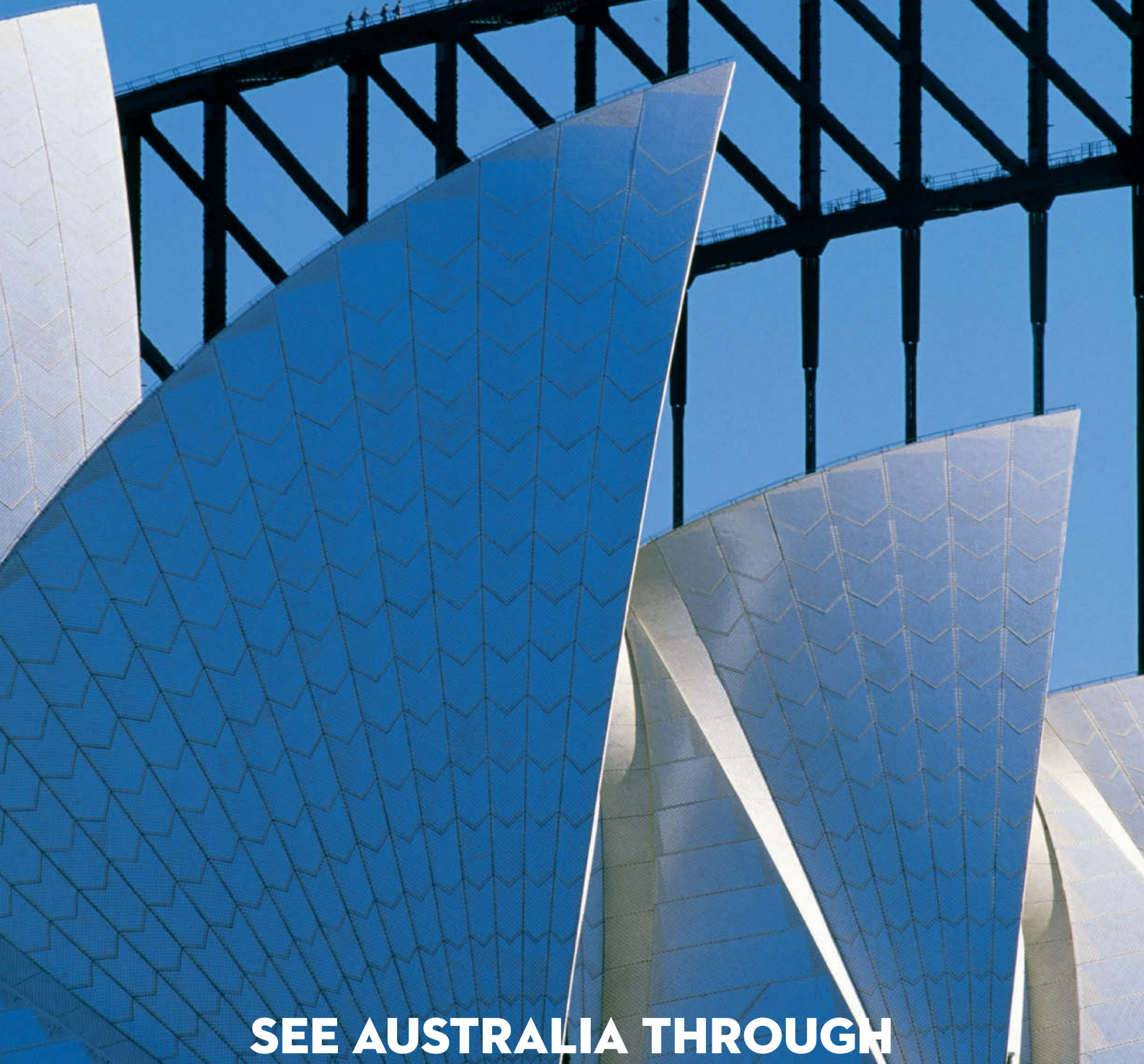
Joel

*Meike Fischer has recently published a German-language book on street photography that goes into a lot of detail on how to shoot street scenes, spontaneous portraits and urban scenery. Check out the publisher's website at [www.dpunkt.de](http://www.dpunkt.de) and search for 'Meike Fischer' to see some sample pages.*



### 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](mailto:editor@ct-digiphoto.com) or at [www.facebook.com/ct-digiphoto](http://www.facebook.com/ct-digiphoto). We reserve the right to abbreviate your input for publication. Our comments are printed in italics.



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# DVD Highlights

This issue's free DVD includes a wide range of free and full version image processing and photo tools, as well as sample images relating to the tests and equipment described in the text. We have also included free, full versions of Perspective Pilot, which will help you to correct perspective errors in your photos, and Photo optimizer, which offers a variety quick and easy photo optimization functions. A set of four expert video tutorials rounds out this issue's offerings.



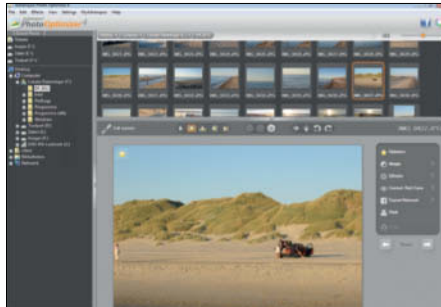
## Using Lines in Photo Composition

**Video tutorials:** In this workshop, pro photographer Eberhard Schuy explains how to use lines to enhance and emphasize the look of a photo.

Photographers use clever and unusual compositions to attract and hold the viewer's attention. This workshop shows how specific stylistic devices can be used to produce successful images.

"The Use of Lines in Photographic Composition" might sound like uninspiring theory, but pro photographer Eberhard Schuy approaches the subject in a clear and practical way, using the Belgian Ardennes mountains as an impressive stage to demonstrate the techniques he describes. This area is full of long, winding boardwalks used by hikers, and Schuy uses these to demonstrate the effects of various types of lines in photographic compositions.

We all know that the look of an image can be altered significantly by changing the shooting angle or position, but the targeted use of horizontal, vertical and diagonal lines to underscore and enhance the resulting composition is a topic that receives less attention. However, using lines to enhance a composition is not always easy, and Schuy uses a range of examples to explain how to avoid common mistakes while shooting, thus avoiding the need to edit your images later. (sea)



## Photo Optimizer

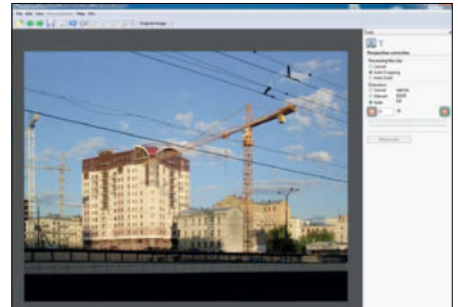
**Full version software:** This powerful one-click image editor is designed to help you perform basic image editing tasks as quickly and easily as possible.

The *Photo Optimizer* package by Ashampoo is perfect for photographers who don't want to spend too much time editing their images. The program's simple interface and one-click approach does away with complex sliders and manual tools settings, and enables you to adjust image color, contrast and brightness in one quick operation. Before and after views make it possible to judge immediately whether the built-in algorithms have produced the effect you are looking for.

If you are not satisfied with the automatically generated results, you can still apply manual corrections, and all adjustments you make are non-destructive, allowing you to revert back to the original image at any time.

*Photo Optimizer* also includes watermarking and red-eye removal functionality and also offers additional vignetting and toning effects for customizing individual images. You can export your results to a variety of formats or social networks that include Facebook and Picasa Web Albums.

A free, fully-functional copy of version 4.0.3 is included on this issue's free DVD, and c't *Digital Photography* readers get a 60 percent discount on any purchase of version 5. (sea)



## Perspective Pilot

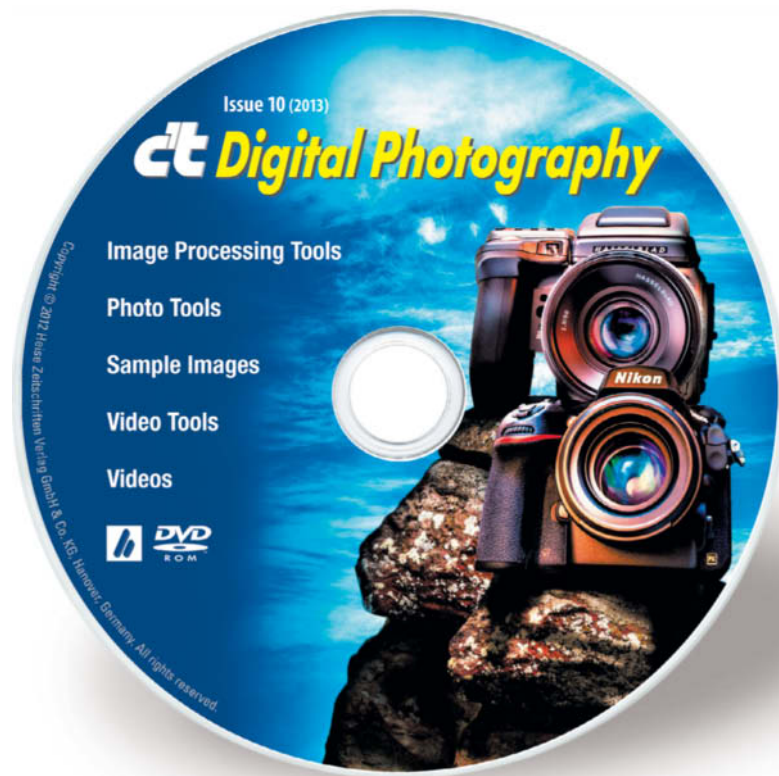
**Full version software:** Perspective Pilot is a great image processing tool for all those who like to shoot architectural photos and urban landscapes.

In the past, photographers had to use complex, expensive lenses to avoid producing perspective errors in their images. Nowadays, digital technology gives us a whole range of alternative ways to keep our photos straight.

*Perspective Pilot* is one of these, and we have included a full version on this issue's DVD. The program is designed to get rid of perspective errors such as converging lines and inconsistent vanishing points. On the subject of converging lines, we once wrote "The Leaning Tower of Pisa is Everywhere", and we all know how easy it is to capture unwanted converging lines, especially if we are photographing churches, towers or other tall buildings in an urban situation in which we simply can't use a high viewpoint. And this is where *Perspective Pilot* comes in – the program's various tools make it simple to straighten all kinds of perspective errors, including the severe distortion that results when you photograph a building using a wide-angle lens.

*Perspective Pilot* not only provides quick and easy tools for straightening converging lines, but also helps to correct our old friend the tilted horizon, and it takes just a few clicks to get even heavily sloping images back on the level. (sea)





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# Portfolio

## Frank Herfort



**A decision six years ago to go to Moscow had far-reaching consequences for Frank Herfort: Russia is now the setting for his major artistic projects and he has become one of the country's most sought-after photographers.**

Frank Herfort has been criss-crossing Russia for the last four years, photographing its tallest buildings from every angle known to architectural photography. Totally unlike conventional urban photos, his images of monstrously massive buildings with an overwhelming presence seem to come from another time and dimension.

All these buildings have sprung up as if from nowhere, backed by the new financial elite that formed after the Soviet Union crumbled. There's no doing things by halves here – these buildings are all about pomp and circumstance and making a statement. Some of the settings, especially the Russian-style rental apartments, accentuate the singularity of the high-rises and the contrast between the two sides of modern Russian life. Towering over everything, these phantasmagorical structures look like something from a parallel universe. The series is titled 'Imperial Pomp – Post Soviet Highrise'.

Whenever he gets a chance between assignments, Herfort hunts out these manifestations of megalomania. The photos are spectacular, perfectly crafted and highly effective, mainly because most people have never seen anything like them. This is

photography 'for the moment' with no unnecessary emotion.

Herfort's most successful project so far takes a very different approach. 'Time in Between' portrays people in public waiting rooms in Moscow in a way that tells complete stories. The scenes seem to be frozen in time, with no beginning and no end; the moment lasts an eternity, and the painstaking composition brings out the otherworldly atmosphere of the rooms. Elsewhere, waiting rooms look like waiting rooms, but the rooms that Herfort found in Moscow are wide open to interpretation and he expertly exploits this ambiguity.

'Time in Between' was Herfort's graduation project at the University of Fine Arts in Hamburg in 2005 and won him multiple awards – quite a start to his career. He had actually intended to shoot the project while he was in London on a scholarship, but the necessary spark of inspiration was lacking, and Moscow had been beckoning for a quite a while. On the spur of the moment, he found a Russian-speaking assistant and set off for Russia in a car loaded with equipment. He lived there until 2011, but he is now based in Berlin.

His other projects include 'Russia at Home', which takes a look inside the homes of the super-rich, and individual photographs such as the two reproduced on page 16.

The photos for 'Time in Between' were shot using an analog 4×5" large-format camera, and the negatives were scanned before being color corrected digitally. Digital cameras with large-format backs were used for most of the post-Soviet mega-building photos.

At 33, Frank Herfort has been extremely successful in the years since that spectacular final university project. Nevertheless, the majority of his time is devoted to commercial work. He presently spends only about 20 per cent of his time on his own art photography, though he plans to change this in the future.

His advice to up-and-coming photographers? A firm foundation with a good degree and the usual internships is essential, but once the groundwork has been done, you have to find your own path. Too many people look for inspiration in well-known role models and keep returning to study the classics. Herfort recommends a different tactic: look for your own 'signature', the thing that only you can do, and never give up the search. (jr)



Arco di Sole, Moscow, 2010 (Imperial Pomp – Post Soviet Highrise)



Nur Otan Party Building, Astana, 2012 (Imperial Pomp – Post Soviet Highrise)



Elephant, Moscow, 2005 (Time in Between)



Sleeping Café, Moscow, 2005 (Time in Between)



World Map, St Petersburg, 2006 (Time in Between)



Staircase, St Petersburg, 2006 (Time in Between)



Missed, Moscow, 2011



Holiday,  
Moscow, 2008

Living Room, Moscow,  
2012 (Russia at Home)





Thomas Saur, Stefan Arand

# Full-frame vs. Medium Format

Since the Nikon D800 was released, the discussion about its true potential hasn't stopped for a moment. Can a full-frame camera that costs US\$3,300 really match the quality produced by the US\$16,000 Hasselblad H4D-40? What are the strengths and weaknesses of these two very different systems? We put them through their paces, and our carefully planned shoots and sample images provide some of the answers.





Sensor resolution is still increasing, and camera manufacturers seem to be involved in an endless race to outdo each other on this front. The latest trump card in the game is Nikon's 36-megapixel D800, with resolution that exceeds even that of some much more expensive medium-format cameras. The question on everyone's lips is whether expensive, complex medium-format digital cameras are still relevant when you can now acquire a full-frame DSLR with higher resolution at a fraction of the cost. But as we all know, resolution isn't everything, and there are distinct advantages to a larger sensor with regard to noise characteristics and contrast in fine subject details. Additional factors that speak for medium-format cameras are the absence of a low pass filter and 16-bit image processing, which both produce additional reserves of quality in the images they capture.

Nikon has also introduced an 'E' version of the D800, which has no anti-aliasing filter and promises better image sharpness as a result. The downside of this approach is an increased risk of producing moiré effects, but Nikon D800E owners seem prepared to make that compromise. Nikon is marketing its new baby as direct competition for the medium-format sector, so it is no wonder that numerous reports crediting the D800 with image quality equal to or better than many medium format cameras appeared in online forums and on video platforms soon after its release. The US\$3,300 Nikon seem like a bargain compared with the five-figure prices the medium-format competition commands.

Interestingly, there are sample images around that demonstrate the superiority of the Nikon under some circumstances but that of medium-format cameras under others. We wanted to know exactly what's what, so we grabbed a Nikon D800 and a Hasselblad H4D-40 and subjected both to a rigorous comparison test shoot. The results not only highlight the strengths and weaknesses of both systems, but also gave us a lot of useful experience that we want to share here too. We can tell you this much in advance: high-end cameras like these are completely unforgiving of shooting errors, and you have to pay attention to a number of important factors if you want to realize their true potential.



The Hasselblad version of this shot captured even the finest details, such as the grainy texture of the numbers on the dials



Hasselblad H4D-40 with the HC 4/120 macro | 1/125 s | f11

## How we Tested

Our tests focused on real-world shooting situations that include a macro shot, a studio portrait, an open-aperture portrait, bokeh and landscape. It is, after all, the visual results that determine the real value of a camera. We provide you with separate, detailed analysis of each situation and sample images to go with each, as well as details of the observations we made while shooting.

We also took both cameras to the *c't Digital Photography* lab, and we have included a table of results on page 38, as well as a table of technical data on page 41.

### Image Processing

In order to make a fair comparison of our sample images, we processed them all using Adobe *Lightroom*, and attempted to produce

colors and tonal values that were as similar as possible for both systems. We also applied slight sharpening to all of our sample images during the RAW conversion process.

The test images and detail crops do not reproduce well in print, so we have also included most of them on this issue's free DVD.

Experience has shown that it is possible to extract more quality from RAW image files if they are processed using the camera manufacturer's own proprietary software. Hasselblad's *Phocus* Software offers more color adjustment options than *Lightroom* or Nikon's *Capture NX 2*, for example when correcting the finer points of skin tones.

## Our Test Cameras

Medium-format	Full-frame
<b>Camera:</b> Hasselblad H4D-40	Nikon D800E
<b>Lenses:</b> HCD 4/28	Zeiss ZF.2 Distagon T* 2.8/21
HC 2.8/80	Zeiss ZF.2 Makro-Planar T* 2/50
HC 2.2/100	AF-S Nikkor 85mm f/1.4G
HC 4/120mm-II	Zeiss ZF.2 Makro-Planar T* 2/100
HC 4/210	AF-S Nikkor 70-200mm f/2.8G ED VR II



The Nikon D800E combined with the Zeiss 100mm macro produced astonishing reproduction quality for a full-frame sensor. Sharpness is only slightly less well defined than the Hasselblad's.



Nikon D800E with a Zeiss ZF.2 Makro-Planar T\* 2/100 | 1/125s | f11

## Macro Shot

We lit our macro sample setup using flash, combined with the HC 4/120mm-II on the Hasselblad and the Zeiss ZF.2 Makro-Planar T\* 2/100 with our D800E. We began by shooting aperture-bracketing sequences with both systems and selected the sharpest shot from each sequence. Due to diffraction effects, optimum sharpness is never actually achieved using the smallest aperture available on a lens. To compensate for the difference in sensor sizes and produce comparable depth of field, we closed the Hasselblad's aperture down by two extra stops.

At first glance, the quality of the two shots is amazingly similar, although we discovered on taking a closer look that the Hasselblad actually captured the finer details of the texture in the metal and the numbers on the watch dials more precisely than the Nikon. Overall, the images captured by the

Hasselblad displayed better detail rendition and microcontrast, although you would need to resort to a very large print to make the differences visible to a casual viewer. The differences we detected would be negligible in the context of an everyday catalog or editorial shoot that doesn't rely on the use of heavily cropped details.

### Conclusion

In macro situations, the H4D-40 offers slightly superior resolution and microcontrast. Tonal quality and detail rendition were directly comparable, and the Nikon/Zeiss combination produced excellent results.

## Studio Portrait

We shot all our studio portraits using the AF-S Nikkor 85mm f/1.4G with the D800E and the HC 2.2/100 with the H4D-40. We stuck to f11 across the board and judged the results (developed using *Lightroom*) by eye. Both cameras delivered RAW files with plenty of color and tonal headroom. With sufficient tweaking, we managed to produce results with the Nikon that pretty well kept pace with the Hasselblad, although the H4D's 16-bit files still offer more overall processing potential.

There are virtually no detectable differences in resolution and sharpness, although the Hasselblad again produced slightly better microcontrast and its skin tones were better graduated and looked a little more vivid in the 100% monitor view. The same was true for natural surface textures such as wood, sand and textiles, which also had a more realistic, three-dimensional feel and details that almost appear to rise from the surface of the image. The Nikon skin tones were flatter and offered less tonal gradation. Using the *Phocus* software to develop the Hasselblad images made these differences more obvious still, especially in the skin tones.

The offset printing process used to produce this magazine covers up a lot of the differences we found, which are only really obvious in high-end prints or a 100% monitor view.



Hasselblad H4D-40 with the HC 2.2/100 | 1/150 s | f11

Studio portrait lit with flash and a softbox. To keep the results as visually similar as possible, both shots were developed in *Lightroom 4*.



Nikon D800E with the AF-S Nikkor 85mm f/1.4G | 1/125 s | f11

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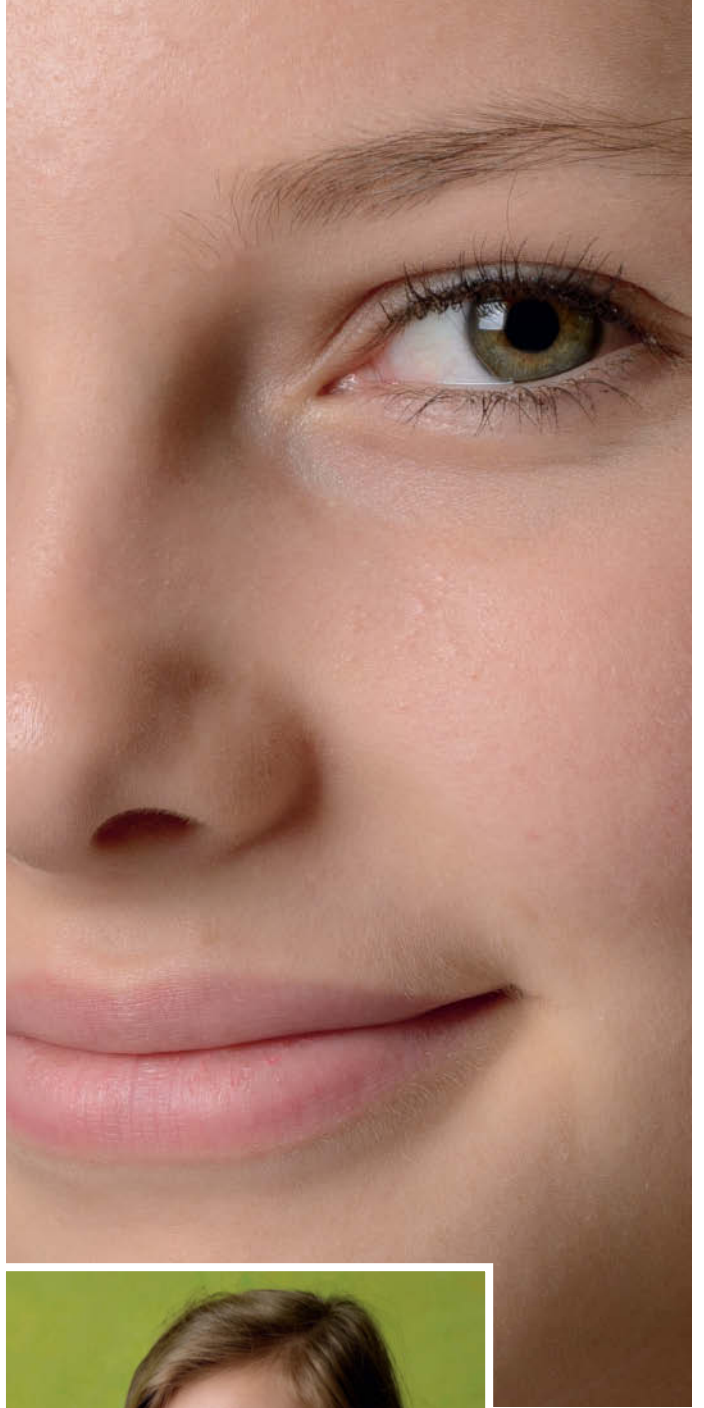


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RAW processing  
performed using  
*Lightroom 4.0*

Hasselblad H4D-40 | 1/250s | f11 | 100mm

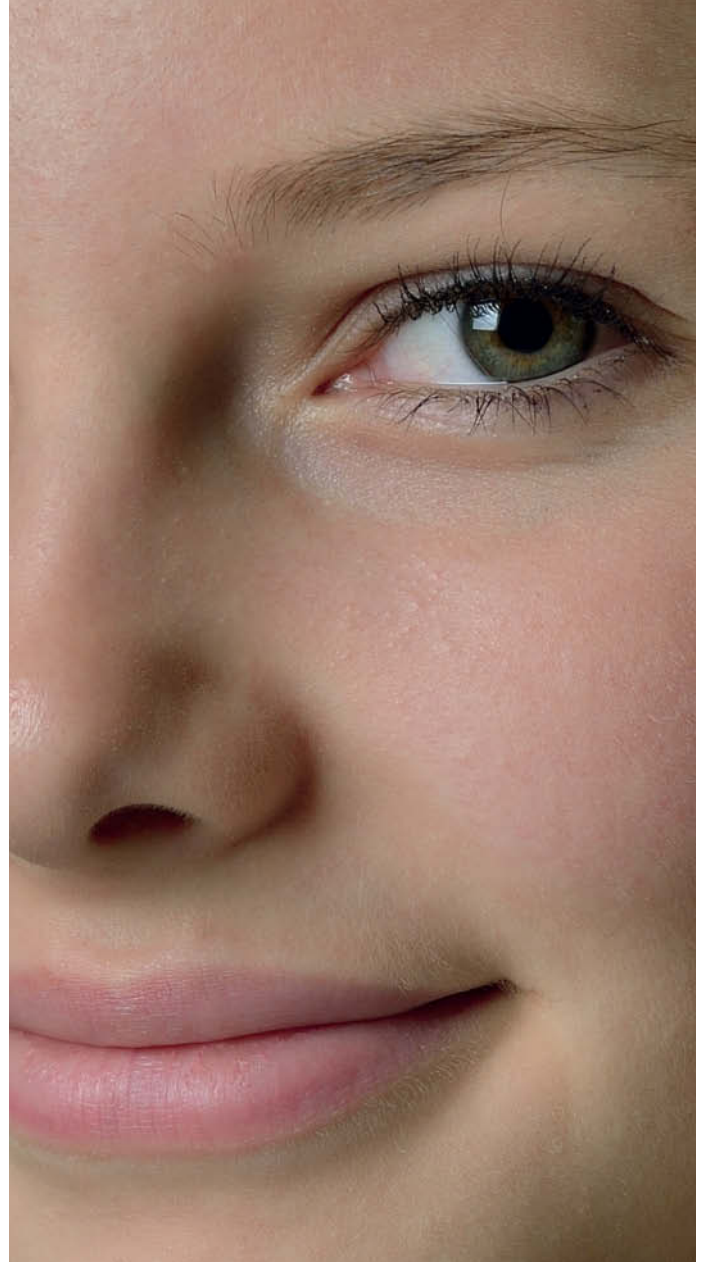


RAW processing  
performed using  
*Lightroom 4.0*

Nikon D800E | 1/125s | f11 | 85mm

The Hasselblad produced more convincing skin detail and tonal gradation





RAW processing  
performed using  
*Phocus 2.6.6*

Hasselblad H4D-40 | 1/250s | f11 | 100mm



RAW processing  
performed using  
*Nikon Capture NX 2*

Nikon D800E | 1/125s | f11 | 85mm

Here, you can see the results of using the manufacturers' proprietary software to develop the images. Hasselblad's *Phocus* package is well thought out and is obviously aimed at professionals aiming for reliable, realistic skin tones and great detail rendition. Nikon's *Capture* offering provides a poor workflow and produces disappointing results – we preferred the *Lightroom* version.



The Hasselblad's theoretical detail superiority didn't always show in our outdoor portraits



Hasselblad H4D-40 with the HC 2.2/100 | 1/800s | f2.2

## Open-aperture Portrait

The aim of this shot was to produce a portrait with shallow depth of field and the best possible bokeh. We positioned our model in slight backlight and lit her indirectly using a large reflector. We used both lenses (the 85mm Nikkor and the HC 2.2/100) at their maximum aperture settings.

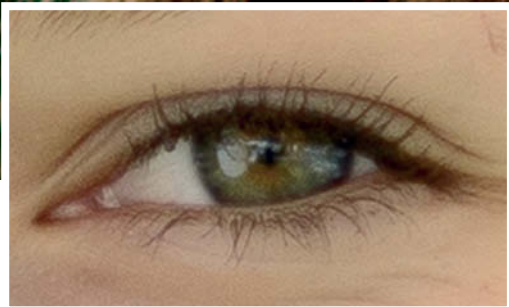
The fantastic quality of the admittedly much more expensive Hasselblad lens was obvious from the start, and the results it produced were vivid, highly three-dimensional and really sharp, and showed virtually no ill effects caused by stray

light. The Nikon lens also performed very well in light of the aperture we used, but simply doesn't match the Hasselblad's overall quality. Stopping down a little visibly improved sharpness and microcontrast in the Nikon results, but of course reduced the accompanying bokeh effect. The Nikon images are slightly soft and lifeless and also suffered from blooming at some high-contrast edges in the shots that were more clearly backlit.

This task gave the Hasselblad every opportunity to demonstrate its strengths.

Provided you shoot carefully and focus precisely, you can use this camera/lens combination to produce clear, sharp images at just about any aperture, although it has to be said that its depth of field is so shallow at f2.2 that it was difficult to keep both our model's eyes in focus in a frame-filling portrait! Under such circumstances, setting and keeping focus is a real challenge.

In order to produce usable outdoor results while shooting handheld, we stopped the Nikkor down to f2 and the HC to f2.8. The Hasselblad's large viewfinder



**In this outdoor situation, the lighter Nikon with its better autofocus system produced less risk of camera shake and better results**



**Nikon D800E with the AF-S Nikkor 85mm f/1.4G | 1/4000s | f1.4**

makes it easier to focus manually, but its autofocus system is not as good as the Nikon's, and the D800E's autofocus hit rate is simply much better.

In contrast to the D800E's ultra-sophisticated system, the H4D-40 has just one relatively large AF area in the center of the frame, which is why Hasselblad has taken the trouble to develop its 'True Focus' technology to help the camera focus automatically on subjects that aren't positioned in the middle of the frame. With most autofocus DSLRs, if you lock focus and

then re-frame your shot, a slight focusing error will result. Hasselblad uses a yaw rate sensor to measure the angular velocity of the camera as you move it and to recalculate the focus position accordingly. The problem with this approach is that if the model moves (even just a few millimeters) once you have begun the True Focus process, the technology doesn't provide sufficient focus accuracy – or at least it didn't in our open-aperture test shots.

Nikon's multiple selectable AF areas make it possible to focus more accurately for

handheld shots, and especially for moving subjects. This makes the D800E the better choice for all moving subjects, including sports events and fashion shoots.

## Conclusion

The D800E won this round purely on the strength of its autofocus system, which made it much easier for us to produce usable results than with the H4D-40.



Hasselblad H4D-40 with the HC 4/210 | 1/40s | f4

## Bokeh

Many pro photographers swear by medium-format cameras because of their superior detail rendition and the vivid, three-dimensional look that the resulting photos often have. The large sensor format produces shallower depth of field than equivalent full-frame angles of view and apertures. Even though medium-format cameras don't have such wide maximum apertures, they are still better at isolating a subject from its background and creating distinct bokeh effects.



The AF-S Nikkor 85mm f/1.4G produces very pleasant, soft bokeh and a look that is absolutely comparable with medium-format shots. However, to produce these kinds of results, you have to be prepared to open the aperture right up and accept some compromises regarding sharpness and contrast.

Nikon D800E with the Zeiss ZF.2 Makro-Planar T\* 2/50 | 1/200s | f2

### Quick Tip

We recommend using an online calculator tool such as the one at <http://www.dofmaster.com/dofjs.html> to calculate precise depth of field for your particular situation. Such a tool also enables you to calculate the settings you need to use to produce equivalent results using full-frame and medium-format gear. For example: using the H4D-40 and the HC 2.8/80 set to f2.8 for a subject distance of one meter, depth of field will equal 3 cm. To capture the same image using the full-frame Nikon, you would have to use a 50mm lens set to f1.4.



Hasselblad H4D-40 with the HC 2.2/100 | 1/750s | f2

## Exposure and Dynamic Range

You would probably expect two different cameras using the same exposure settings under the same lighting conditions to produce pretty much the same range of tonal values in the resulting image. However, it seems digital camera manufacturers follow exposure control philosophies that differ just as much as the look produced by different analog film stock. Our sample images show that Hasselblad has obviously tweaked its system so that it tends slightly toward underexposure but ensures well-defined highlight detail. In



The backlit situation meant that we had to brighten the shadows later using *Lightroom*. This process produced obvious noise in the Hasselblad version of the shot.

contrast, the Nikon system appears to put more emphasis on shadow detail.

The shot of the scales and fruit was backlit, which meant that the scales themselves were slightly underexposed. To get the look we wanted we significantly brightened the

shadows in both versions – we were surprised to find that the Nikon shot contained much more detail headroom in the shadows than the Hasselblad version. We were able to brighten the Nikon image quite easily without producing obvious noise artifacts in the



Nikon D800E with the AF-S Nikkor 85mm f/1.4G | 1/400s | f2



We were able to brighten the shadows in the Nikon shot without producing too much additional noise

process, but we could only brighten the H4D-40 file if we were prepared to accept a lot of additional noise, making it difficult to achieve satisfactory results. On the other hand, the transitions in the Hasselblad shot are smoother and more detailed, while the

Nikon produced some obvious zigzagging. If you know what to look out for, you can compensate for the shortcomings of both cameras by using appropriate exposure settings. Overall, the Hasselblad offers slightly better dynamic range.

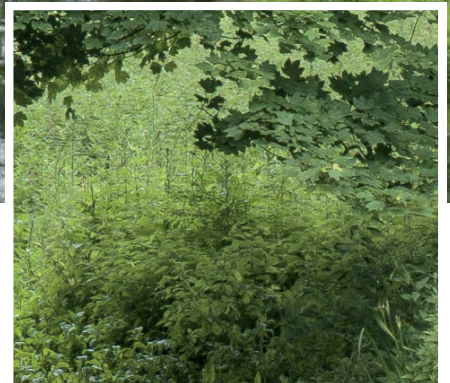
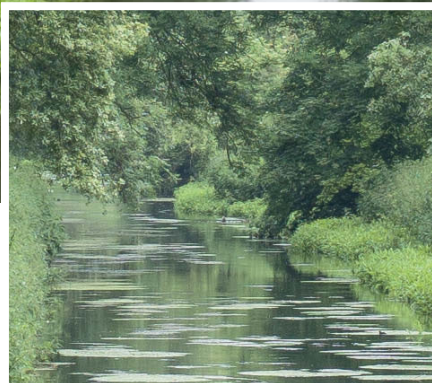
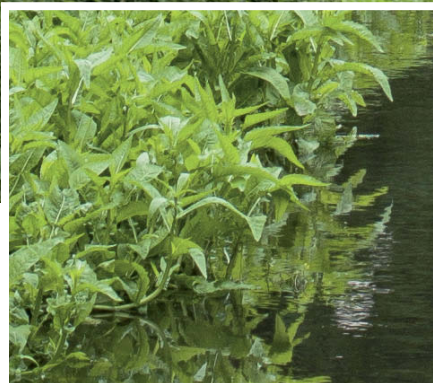


Hasselblad H4D-40 with the HC 4/210 | 1/80s | f16



Nikon D800E with the AF-S Nikkor 70-200mm f/2.8G ED VR II | 1/400s | f4.4 | 170mm

The Nikon shot displays almost no detail in the sky, whereas the Hasselblad did a much better job of capturing the texture of the clouds and produced an image that is generally more vivid and three-dimensional



The image we captured using the H4D-40 shows very fine differentiation between the various green tones and is highly tactile all the way down to the finest details in the leaves

Hasselblad H4D-40 with the HC 2.8/80m | 1/40s | f10

## Landscape

We shot this landscape using the H4D-40 and the HC 2.8/80 at f10 and 1/40s. To avoid camera shake at this slow shutter speed, we also used mirror lock-up and mounted the camera on a tripod.

We used the Zeiss ZF.2 2/50 Makro-Planar at f8 and 1/100s to shoot the same scene with the D800E. The movement of the Nikon's much smaller mirror had a negligible effect on the sharpness of the resulting image.

Although the pixel-level resolution of both cameras appears similar at a first glance, the Hasselblad produced an image with an even greater feeling of depth than in our previous portrait test.

The medium-format image displays better microcontrast and rendered the filigree structures of the vegetation more effectively as a result. The larger, 16-bit color space offered by the Hasselblad produced better tonal differentiation and more precise detail rendition in the finer parts of the subject, and enabled us to perform more post-processing without too much loss of image quality. We were able to apply stronger gradients and heavier tonal value adjustments while retaining the tactile look of the image, whereas the Nikon image began to look a little flat following much less serious processing. This lack of headroom

makes it more difficult to capture landscapes reliably, especially in the changeable lighting conditions that often prevail in outdoor situations. We were better able to restore pixels affected by blooming in the H4D-40 files, while the Nikon once again produced more workable shadow detail.

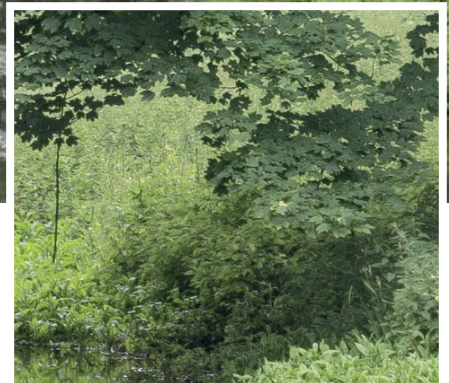
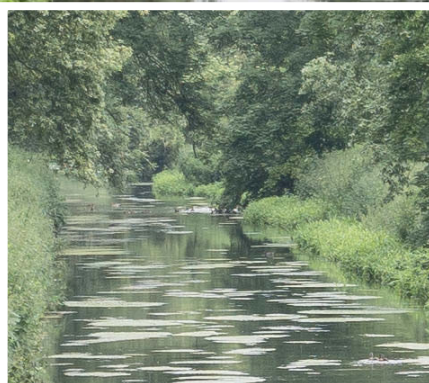
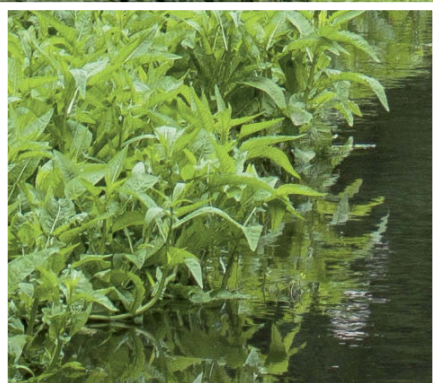
The Hasselblad's large viewfinder makes it easier to compose landscape images, although the Nikon offers live view as an alternative. In combination with a monitor magnifier and the monitor zoom function, it is possible to use live view and manual mode to focus precisely and judge depth of field in real time before releasing the shutter.





### Quick Tip

The H4D-40 is the only medium-format camera in the Hasselblad range to offer built-in long exposure functionality that allows you to program exposure times of up to 256 seconds. This gives creative photographers a whole new range of possibilities, for instance for night shots or light painting applications.



Nikon D800E with the Zeiss ZF.2 Makro-Planar T\* 2/50 | 1/100s | f8

The D800E used with the Zeiss ZF.2 50mm f/2.0 macro lens captured all the available detail, although overall, the image looked slightly weaker than the Hasselblad version and didn't provide quite such fine distinctions between the various green tones

## Conclusion

Both systems are eminently suitable for landscape photography, and the best one to choose will depend on the type of photo you want to shoot. If you are after the best possible image quality and you need as much processing headroom as possible, medium format should be your first choice. The downside of this choice is the higher price and greater weight of the equipment you will have to carry with you. For regular travelers and adventure photographers, the Nikon makes an extremely practical lightweight alternative.

## Camera Handling

A lightweight camera is a real bonus on carefully planned landscape shoots that require you to cover long distances on foot to reach your subject. If this is the case, the lighter weight of the lenses, tripod and other accessories required also speak for the Nikon. The D800's weatherproof body also makes shooting outdoors in inclement weather a less nail-biting experience. To make up for the potential disadvantage of the smaller viewfinder, use a monitor magnifier or the camera's focus confirm functionality.

Nevertheless, some photographers simply prefer the heavyweight build and image quality that a medium-format camera provides.

Whatever your personal preference, the extreme resolution of both cameras is unforgiving of even the slightest camera shake, whether due to mirror movements, wind or a sloppy tripod, so they have to be handled extremely carefully if you want to produce high-quality results.

## Comparing Lenses

The greater the sensor resolution, the greater the demands on your lenses. We compared several lenses for both systems to see if they are capable of doing justice to the high-end hardware built into the cameras. As already mentioned, we tested the D800E with Nikon and manual-focus Zeiss lenses. Manual focus

is often an advantage for specialist themes like macro and landscape photography.

Once again, we found that ultra-wide-angle lenses produce optical anomalies that are very difficult to correct, especially at the edges of the frame where the light rays hit the sensor at a steep angle.

We selected the Zeiss Distagon T\* 2.8/21 (the best full-frame ultra-wide-angle lens we know) as a worthy competitor to the famously sharp Hasselblad HCD 4/28.

In spite of its extremely high quality, the Zeiss showed weakness in edge detail throughout the entire aperture range when



### Cityscapes

We used the HC 4/210 with the Hasselblad and the AF-S Nikkor 70-200mm f/2.8G ED VR II with the Nikon to shoot all of these images. We used mirror lock-up and a tripod to prevent camera shake.

The Nikkor doesn't stand a chance in direct competition with the Hasselblad heavyweight, and edge detail especially shows obvious weakness. Unfortunately, the zoom also comes a clear second even when used stopped down. In this case, the lens simply doesn't make the most of the available resolution. In contrast, the Hasselblad's detail rendition remains consistently excellent throughout the entire frame.



compared with the (approximately 21mm equivalent) Hasselblad HCD 4/28. The HCD displayed much less edge fall-off at maximum aperture and virtually no ill effects at f8 and beyond. The Zeiss wasn't even capable of holding its own against the Hasselblad in terms of center sharpness at maximum aperture. The small amounts of distortion and slight vignette effects produced by both lenses were easily corrected using *Lightroom*.

The Zeiss Makro-Planar T\* 2/50 produced excellent detail right into the corners at f4 and beyond, while the Hasselblad HC 2.8/80 produced constant sharpness in all image areas right from its f2.8 maximum aperture.

The Makro-Planar T\* 2/100 delivered virtually perfect results from f2.8 onward and provided us with the best overall sharpness that we were able to capture with the Nikon during the entire test. The 70-200mm Nikkor simply cannot compete and produced obvious edge fall-off across the entire zoom

range. Edge sharpness is only really usable at f8 and beyond, while center rendition is adequate from f4 onward.

We found the results produced by the AF-S Nikkor 85mm f/1.4G to be too soft over the entire frame at maximum aperture, although the effect disappeared quickly in the center of the frame from f2.8 onward. Edge and corner definition followed suit at f4 and beyond. The HC 4/120-II leaves nothing to be desired, even at maximum aperture, producing no discernible edge weakness at any time.

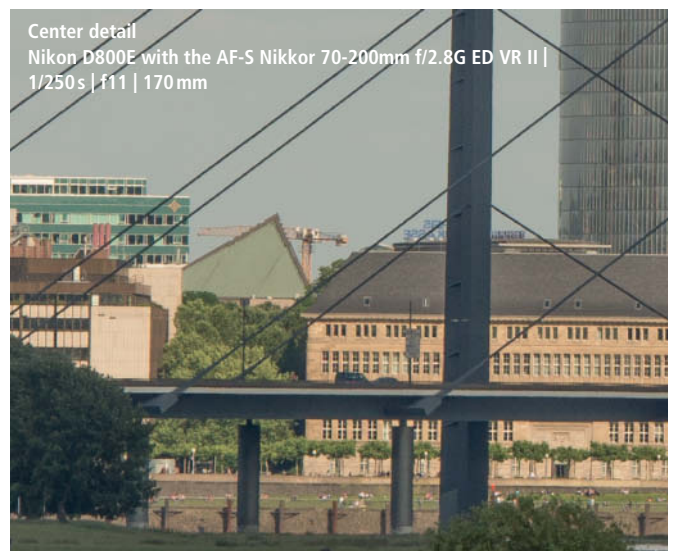
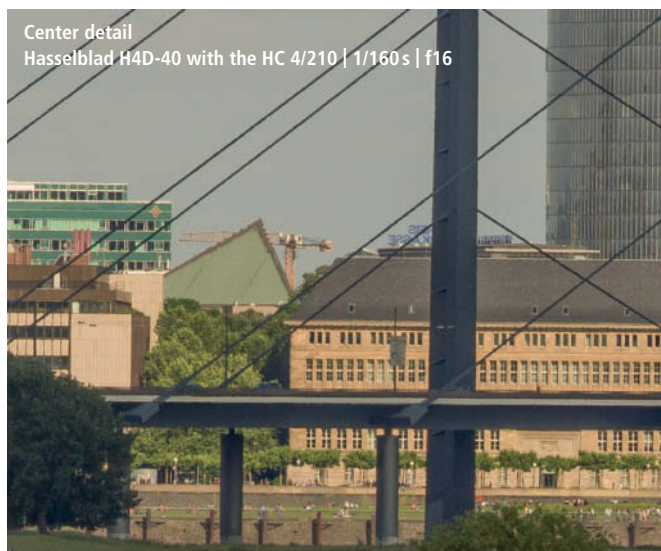
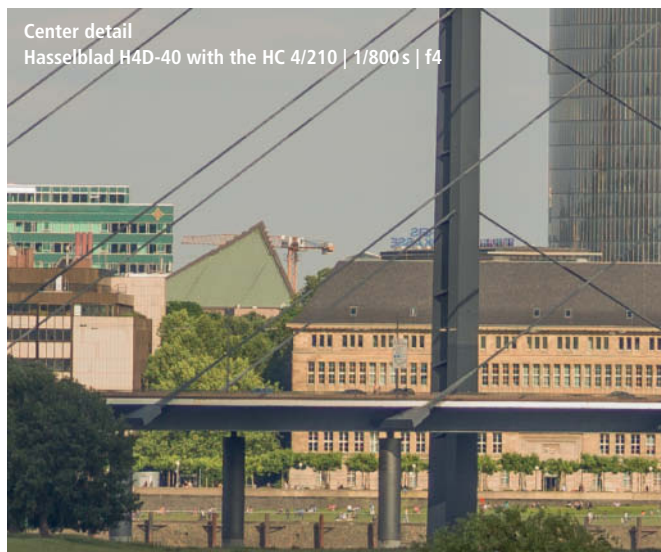
### Conclusion

One distinct advantage of the D800E is the huge range of compatible Nikkor and third-party lenses available for it. The camera's relatively shallow throat depth also makes it suitable for use with adapted lenses from other manufacturers. However, you still need to make sure that the lens you are considering

is good enough to do justice to the Nikon's sensor before you invest in it.

At the end of the day, we couldn't avoid the feeling that the Nikon D800E offers potential image quality that isn't matched by many of the high-end lenses on today's market. On the other hand, the Zeiss Makro-Planar T\* 2/100 shows just what is possible if the camera is coupled with an appropriately high quality lens. The results were ultra-sharp and directly comparable with medium-format images at all but the very largest aperture setting. In comparison, the US\$2,400 that Nikon charges for its 70-200mm zoom simply doesn't represent good value.

Except for the slight edge blur we found using the HCD 4/28 at maximum aperture (which was much less obvious than that produced by the Nikon/Zeiss combo), the Hasselblad lenses we tested all delivered consistently good sharpness throughout the frame.





Hasselblad HCD 4/28 at maximum aperture (f4)



Zeiss Distagon T\* 2.8/21 at maximum aperture (f2.8)

The Hasselblad HCD 4/28 clearly shows less edge weakness than the Zeiss Distagon T\*2.8/21 at maximum aperture. However, the Zeiss is extremely sharp in the center of the frame at all apertures.



Hasselblad HCD 4/28 at f11



Zeiss Distagon T\* 2.8/21 at f8

The Zeiss' edge definition is still poor, even at f8. At f11, the Hasselblad produce faultless results throughout the entire frame.



Hasselblad HC 2.8/80 at maximum aperture



Zeiss Makro-Planar T\* 2/50 at maximum aperture



Hasselblad HC 2.8/80 at f11



Zeiss Makro-Planar T\* 2/50 at f8

A comparison of the two best standard lenses once again reveals more obvious weakness on the part of the Zeiss Makro-Planar T\* 2/50 at maximum aperture than that produced by the Hasselblad HC 2.8/80. Both lenses produced very good center sharpness at maximum aperture and excellent overall sharpness when used stopped down.



AF-S Nikkor 70-200 mm f/2.8G ED VR II set to 100mm and maximum aperture (f2.8)



Zeiss Makro-Planar T\* 2/100 at maximum aperture (f2)



AF-S Nikkor 70-200mm f/2.8G ED VR II set to 100mm and f8



Zeiss Makro-Planar T\* 2/100 at f8

The difference in image quality at maximum aperture is even more obvious when comparing the fixed focal length 100mm Zeiss lens with the Nikon zoom at its 100mm setting. The Zeiss is capable of producing quality worthy of the camera's monster sensor, whereas the Nikon zoom is very weak at the edges of the frame and still shows some softness in the center. Even at f8, the zoom still produces weak edge performance, and here too, the Zeiss does a much better job.

## ISO Comparison

Available light photography is a special challenge for both photographer and equipment. In poor light, the only way to ensure that you can use sufficiently short exposure times to prevent camera shake is to increase the ISO sensitivity setting.

Both of our test systems produced similar results at ISO 400, but the Nikon displayed much less obvious noise in critical image areas at ISO 800 and beyond. The noise characteristics displayed by the H4D-40 at ISO 1600 were similar to those shown by the D800E at ISO 6400, making the Nikon the clear winner in the ISO stakes.

The images produced by the H4D-40 at ISO 800 and above show obvious color noise in the shadows but delivered marginally better highlight detail at ISO 400. At ISO 800 and beyond, the Nikon produces superior results throughout the frame.

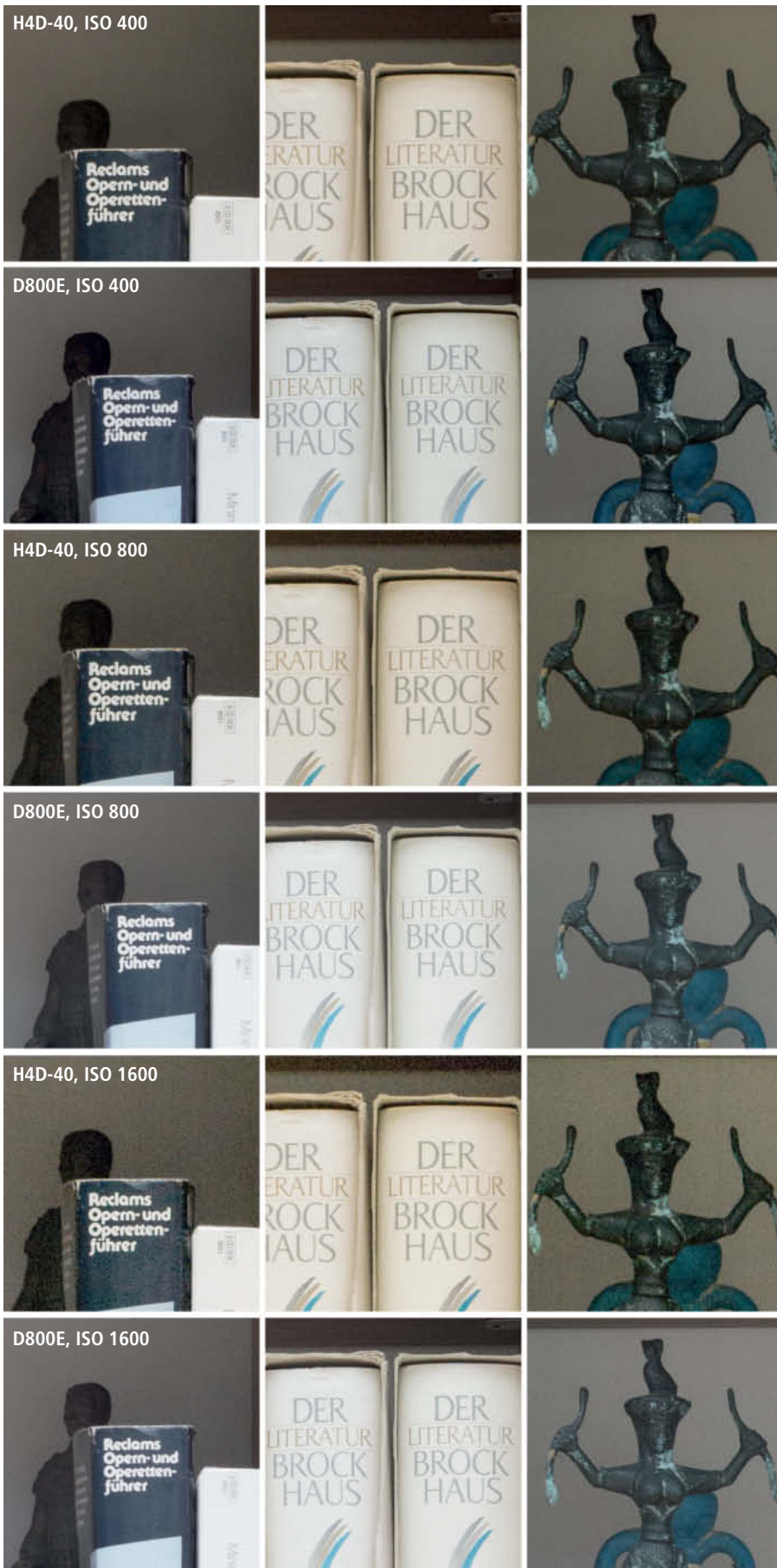
### Conclusion

Generally speaking, if you tend to end up shooting handheld in low light, the D800E is the better choice. The Nikon offers more ISO-based room for maneuver when it comes to retaining image quality while squeezing shorter exposure times out of the camera.

**ISO 400:** Both cameras show slight noise, especially in the shadow areas. There are no visible noise artifacts in the highlights.

**ISO 800:** The D800's superiority is already visible at this level. The Artifacts produced by the H4D-40 are particularly obvious in the shadow details.

**ISO 1600:** While the Nikon's noise characteristics change only slowly with increasing sensitivity, at this level, the H4D-40 is already producing obvious noise artifacts. Detail rendition is still good, but luminance noise begins to appear alongside the existing color noise.





The Hasselblad H4D-40

## Lab Tests

The results we achieved in our test lab basically confirmed the observations we made while we were out and about. We were surprised by the relatively poor noise results that the D800E produced in comparison with our test of the standard model D800 (see our multi-camera test in issue 9 of *c't Digital Photography*). The reason is probably that we conducted the tests for the D800E on RAW image files in order to keep the comparison with the H4D-40 (which can only save RAW files) fair. In this test, we developed the images from both cameras using the same parameters in *Lightroom 4*,

whereas the JPEG images we tested in issue 9 were developed internally by the camera's firmware, which automatically applies a variety of optimization steps – including noise reduction – during the process.

The resolution values recorded by both cameras are very high indeed and change relatively little across a broad range of ISO values (up to ISO 1600 for the Hasselblad and ISO 6400 for the Nikon). The Nikon D800E delivers high maximum contrast at ISO 100 and satisfactory contrast right up to ISO 1600, whereafter it drops off continuously. Its

signal-to-noise ratio is good up to ISO 100, adequate up to ISO 800 and becomes visibly poorer thereafter. The visual noise values we recorded behaved similarly and began to drop off at ISO 1600 and above.

The H4D-40 produced high maximum contrast values at ISO 100 and passable values up to ISO 400, above which there is significant fall-off. Its signal-to-noise ratio is good at ISO 100 but begins to drop off significantly at ISO 400. Here too, the visual noise values we recorded followed a similar pattern but are already very poor at ISO 1600.

### TEST RESULTS, PART 1

	Sensor resolution [Lp/h] better >	Relative center resolution (ISO 100, wide-angle) better >	Center resolution (ISO 100) [lp/h] better >	Center resolution (ISO 400) [lp/h] better >	Center resolution (ISO 800) [lp/h] better >	Center resolution (ISO 1600) [lp/h] better >	Center resolution (ISO 3200) [lp/h] better >
Hasselblad H4D-40 with the HC 2.8/80	2738	120	3285	3285	3285	3285	–
Nikon D800E with the AF-S Micro Nikkor 105mm f/2.8G VR	2456	109	2679	2597	2555	2592	2681

### TEST RESULTS, PART 2

	Signal-to-noise ratio [S/Nx] ISO 100 better >	Signal-to-noise ratio [S/Nx] ISO 400 better >	Signal-to-noise ratio [S/Nx] ISO 800 better >	Signal-to-noise ratio [S/Nx] ISO 1600 better >	Signal-to-noise ratio [S/Nx] ISO 3200 better >	Signal-to-noise ratio [S/Nx] ISO 6400 better >	Visual noise OECF20 ISO 100 < better
Hasselblad H4D-40 with the HC 2.8/80	63.0	34.0	22.0	13.0	–	–	1.0
Nikon D800E with the AF-S Micro Nikkor 105mm f/2.8G VR	67.0	35.0	25.0	18.0	13.0	9.0	0.8



The Nikon D800E

### Quick Tip

If you want to get the most out of the Nikon D800E's mega-sensor, you will need to use fixed focal length lenses set to their optimum aperture. We recommend that you take a look at the excellent lenses offered by third-party manufacturers such as Zeiss or the Leica R series, which can be adapted for use with the Nikon mount. These lenses require manual focusing, but reward the patient photographer with excellent microcontrast and great sharpness, especially at the edges of the frame. The Nikon's built-in focus confirm indicator or live view (with an optional monitor magnifier) are great ways to help you focus accurately.

## Final Conclusions

The hype surrounding the introduction of the Nikon D800E is largely justified. This is an impressive camera with a compact, lightweight weather-resistant body, a wide range of sophisticated functionality and image quality that gives it a unique position among today's full-frame DSLRs. This upstart represents a real challenge to most full-frame DSLRs and – with its unique, ultra-high-resolution sensor – to many medium-format cameras too.

Our test images showed that the promise of medium-format resolution in a full-frame

package was particularly true in the center of the frame, while the Nikon's edge definition simply wasn't up to that of the Hasselblad when shooting at maximum aperture. This fact underscored our suspicion that the quality of the available lenses plays a significant role in differentiating the performance of these two systems. There are very few lenses out there that are capable of making the most of the Nikon sensor's extreme resolution.

We found that even Nikon's own-brand lenses couldn't really hold their own with the

36-megapixel (Sony-built) sensor. The Hasselblad's excellent Fujinon lenses are perfectly suited to squeezing the best possible quality out of a high-resolution sensor and are easier to use. They also produce better results at wide apertures. In the end, the H4D-40 won the day in the object, landscape and architectural photography categories with its excellent sharpness characteristics that consistently reach the very edges of the frame.

Generally speaking, under controlled shooting conditions, the Hasselblad,

Center resolution (ISO 6400) [lp/h] better >	Contrast/Subject range, ISO 100 [in f-stops] better >	Contrast/Subject range, ISO 400 [in f-stops] better >	Contrast/Subject range, ISO 800 [in f-stops] better >	Contrast/Subject range, ISO 1600 [in f-stops] better >	Contrast/Subject range, ISO 3200 [in f-stops] better >	Contrast/Subject range, ISO 6400 [in f-stops] better >	Real subject range [# of tonal values] better >	Color Checker SG ΔE ISO 100 ← better
–	10.0	8.0	6.7	5.7	–	–	256	10.9
2947	11.0	9.7	8.7	8.0	7.0	6.0	251	8.3

Visual noise OECF20 ISO 400 ← better	Visual noise OECF20 ISO 800 ← better	Visual noise OECF20 ISO 1600 ← better	Visual noise OECF20 ISO 3200 ← better	Visual noise OECF20 ISO 6400 ← better	Startup time [s] ← better	Shutter lag (wide-angle) at >1000 lx in LiveView [s] ← better	Shutter lag (wide-angle) at >1000 lx [s] ← better
2.1	3.5	6.3	–	–	7.9	–	0.6
1.5	2.1	2.9	4.2	6.2	0.2	0.9	0.2

## Hasselblad H4D-40

### For

- Better image quality up to ISO 200/400
- Image files offer more processing headroom
- Better dynamic range, highlights especially can be more easily restored
- Better lenses produce better detail sharpness in all image areas
- 16-bit image capture
- Better skin tones
- Images generally appear more three-dimensional
- High-end tilt/shift adapter available
- Other Hasselblad/Zeiss lenses can be used with adapter
- Much better viewfinder
- True Focus autofocus assist
- Approximately 10 percent more sensor resolution
- Includes *Lightroom 4* and *Phocus* software
- Long exposures programmable up to 4 minutes
- Manufacturer's proprietary *Phocus* software delivers better color fidelity, color quality and DAC digital lens correction functionality
- Excellent tethering functionality, remote camera control via *PhocusMobile* for iOS

### Against

- Poor monitor
- Slow handling
- Only one focus area
- Slow autofocus
- Prone to camera shake due to heavy mirror movement, often requires mirror lock-up.
- Large and heavy
- Body not weatherproof
- Shortest exposure time 1/800 s
- Relatively small range of available lenses
- No adapter option for third-party lenses

**Approximate Retail Price US\$16,000 (body only)**

## Nikon D800E

### For

- Excellent high-speed autofocus
- 4 fps continuous shooting
- Weatherproof body
- Consistent image quality at high ISO sensitivity
- Larger range of compatible lenses than any medium-format camera
- Compatible with high-end third-party lenses from Zeiss and Leica (R series with adapter)
- Short throat depth makes adapting lenses simpler
- Image-stabilized lenses available
- Shadow detail can be more easily restored
- Compact dimensions
- Video functionality
- Live view
- High-quality monitor
- Built-in HDR functionality
- RAW and JPEG capture
- Twin card slots provide extra capture flexibility
- *Phocus* software can read Nikon image files
- Nikon RAW editing software included
- Relatively low price

### Against

- 'Only' 14-bit color depth
- Viewfinder difficult to use with manual focus lenses
- Nikon lenses only able to match sensor quality at medium or small apertures
- High pixel density quickly tests the limits of lens resolution, especially at wide apertures and using ultra-wide-angle lenses

**Approximate Retail Price US\$3,300 (body only)**

with its consistently sharp, highly three-dimensional-looking results and additional 16-bit processing headroom, wins the day at lower sensitivity settings up to ISO 400.

On the other side of the coin, the D800E offers a lightweight, high-performance alternative for all photographic tasks that demand speed and flexibility – such as sports, outdoor portraits, fashion shoots and low-light situations.

Both systems deliver extremely high-quality results with sharpness and resolution that are difficult to distinguish when printed at normal sizes up to about A3 (approximately 12 x 17 inches). At low ISO

settings, the medium-format system just nosed ahead with regard to absolute image quality, but the introduction of the new Nikon has seriously diminished the comfortable lead that medium-format cameras enjoyed until recently.

The single most limiting factor for both systems is probably the photographer's own technical ability. You have to know how to handle a camera of this caliber properly if you want to make the most of its unique capabilities. Choice of lens, the best aperture to use, preventing camera shake, precise focusing and high-end RAW processing software are just some of the factors that you must have under control. (pen)



HIGH-RESOLUTION FULL-FRAME AND MEDIUM-FORMAT DSLRs



Manufacturer/Model	Hasselblad H4D-40	Nikon D800E
URL	www.hasselblad.com	www.nikon.com
<b>Digitization</b>		
Native resolutions (in pixels)	7304 × 5478	7360 × 4912, 5520 × 3680, 3680 × 2456 (36 × 24), 6144 × 4080, 4608 × 3056, 3072 × 2040 (30 × 20), 4800 × 3200, 3600 × 2400, 2400 × 1600 (24 × 16), 6144 × 4912, 4608 × 3680, 3072 × 2456 (30 × 24)
Sensor type, effective megapixels / Size / Self cleaning	CCD, 40 million / MF (43.8 mm × 32.9 mm) / –	CMOS, 36 million / KB (35.9 mm × 24.0 mm) / ✓
Image format(s) / Compression rates / Video format	RAW 3FR (16-bit), TIFF (8 Bit) / 1 / –	RAW, TIFF, JPEG, RAW+JPEG / 3 / MPEG-4 H.264
Video: Max. resolution [pixels], length, fps	n/a	Full HD 1080p, 29 min 59 s, 30
Memory card type / Average file size <sup>1</sup>	CF / 52 MB (.3fr)	SD(HC/XC) + CF I / 23.4 MB
<b>Features</b>		
Crop factor (full-frame equivalent) / Bayonet	0.8 / Hasselblad H	n/a / Nikon F (AF)
ISO settings	100-1600 in 1/1 increments	Auto (200 – upper limit + longest exposure time up to 1 s programmable), (ISO 50) 100-6400 (ISO 25 600) in 1/3, 1/2 or 1/1 increments
Shutter speeds (s) / Default flash sync (s)	25-1/800 s / User-defined	Bulb, 30-1/8000 / 1/250
Focusing / Image stabilizing	AF (one-shot) / –	AF (one-shot, continuous, tracking), MF / – (in-lens)
AF areas / Focus assist lamp	1 cross sensor	51 (15 cross sensors) or 1 (with 51 or 11 positions) or selected combinations (21 or 9) / ✓ (white)
Metering: Matrix / Center-weighted / Spot	– / Spot, Center-weighted, CenterSpot / ✓	✓ (91,000 pixels) / ✓ (4 metering area sizes) / ✓
Programmed auto / Scene modes / Custom presets	✓ (with shift) / – / ✓ (4 presets)	✓ (with shift) / – / ✓ (4 presets)
Exposure: Aperture priority / Shutter priority / Manual	✓ / ✓ / ✓	✓ / ✓ / ✓
Exposure compensation [EV] / Depth-of-field preview	±5 EV in 1/3, 1/2 or 1/1 increments / ✓	±5 EV in 1/3, 1/2 or 1/1 increments / ✓
Bracketing: Exposure / WB / Focus / Interval timer / Sound	✓ (highly configurable) / ✓ / – / ✓ / –	✓ (highly configurable) / ✓ (+ D-Lighting bracketing) / – / ✓ (+ time-lapse) / ✓ (16-bit, mono <sup>2</sup> , 48 kHz)
Self-timer / Continuous shooting speed (JPEG/RAW) <sup>6</sup>	User-selectable from 1 s to 1 hour / 0.9 fps (unlimited)	20, 10, 5 or 2 s (1-9 shots, 0.5-3 s intervals) / 4.0 fps, 100 shots; 4.0 fps, 100 shots (5-1 fps selectable)
White balance: Auto + Manual / Presets / Fine-tuning		2 auto + 4 manual / 12 / ✓ (and Kelvin)
Sharpness, Contrast, Saturation adjustable / Color spaces		✓ (Fine-tuning) / sRGB, Adobe RGB
Viewfinder: Type / Magnification / Coverage / Eyepiece distance	Eye-level / n/a / 100 % / n/a	Pentaprism / 0.7x / 100 % / 17 mm (with built-in blind)
Monitor: Diagonal / Resolution (dots) / No. of brightness settings	3" / 460 320 / na	3.2" / 921 000 / 11 or auto
Live View / With AF using sensor / Dedicated sensors	–	✓ (5-30 min. or unlimited) / ✓ / –
Body material / Control panel / Auto monitor rotation	Metal / ✓ (backlit) / ✓	Magnesium, weatherproof / ✓ (green backlight) / –
4-way selector / Multi selector / Command dials	✓ / – / 2	✓ (8-way + center button) / 1 / 2
Flash guide number (ISO 100) / Charge time / Connector	12 / na / ✓ (TTL shoe, X-Sync socket)	12 / 4.4 s / ✓ (TTL shoe, X-Sync socket)
<b>Playback</b>		
Multiple (# of images) / Zoom / Histogram	9 or 4 / ✓ / ✓	72, 9 or 4 / ✓ / ✓ (with RGB)
<b>Connectors/Dimensions</b>		
Power source	Li-ion rechargeable battery	Mains adapter (dummy battery), Li-ion battery, battery grip
Interfaces / A/V out / HDMI / Remote control	FireWire (IEEE 1394b)	USB 3.0, GPS IN / – (Stereo microphone IN, headphones) / ✓ (type C) / ✓ (Cable)
Dimensions (W/H/D) / approx. weight (body only)	153 × 131 × 205 mm, 2290 g <sup>3</sup>	146 × 123 × 82 mm / 995 g
<b>What's in the Box</b>		
Manual / User guide	User manual	Quick start guide, User manual
Accessories	HVD 90° viewfinder, digital back, Li-ion battery	Li-Ion battery EN-EL15 (7.0 V, 1900 mAh, 14 Wh), charger, body cap, flash shoe cover, transparent monitor cover, shoulder strap, USB cable
Optional accessories	Waist-level viewfinder, tilt/shift adapter, GPS receiver, flash adapter	Memory cards, mains adapter + battery chamber adapter, cable remote release, GPS receiver, WiFi adapter, HDMI cable, microphone, angle finder, Nikon system accessories
<b>Software</b>		
Standalone software (platform)	Phocus (Win/Mac)	Nikon ViewNX 2 (Win/Mac)
Recommended retail price	US\$16,000	US\$3,300
<sup>1</sup> Average value, measured using largest native image size and best JPEG quality <sup>2</sup> Stereo via external microphone <sup>3</sup> Including HC 2.8/80, battery and CF card		
✓ included    – not included    n/a not applicable		



Peter Nonhoff-Arps

# Full-frame or Medium Format?

Ultra-high-resolution DSLRs with full-frame sensors are beginning to break into a market once dominated by medium-format cameras, so it's no wonder that the medium-format sector is developing fast to keep up. The result is a two-pronged trend toward higher sensor resolution and smaller, less expensive entry-level camera models.

## » Ultra-high-resolution Full-frame Cameras

The Nikon D800/D800E is the first of what is sure to be a new wave of cameras with full-frame sensors and medium-format resolution. Among the few others currently available are the Sigma SD1 Merrill (see our multi-camera test in Issue 9 of *c't Digital Photography*) and the Leica M9-M. Both are unique in their own ways. Sigma claims sensor resolution of 46 megapixels for the Merrill, although this figure is the result of adding together the pixels from each of the Foveon sensor's three layers. These capture pixels for each of the primary (RGB) colors separately, giving the camera 'real' three-color data for each image pixel, whereas 'conventional' cameras such as the Nikon D800E or the Hasselblad H4D-40 interpolate color data from neighboring pixels using a Bayer Pattern RGB filter located in front of the sensor. Both of these models do without the optical low-pass filter built into most DSLRs, thus allowing more of the ambient light to reach the sensor directly, but making them more prone to producing moiré artifacts. While the Sigma camera's sensor design makes a low-pass filter unnecessary, the image files it produces are

nevertheless 'only' 14.8 megapixels in size. Having said that, the data they contain is not interpolated, so the physically measurable resolution is comparatively high for the size of the files involved (once again, see our test in Issue 9). Like the Hasselblad H4D-40, the Sigma produces its best results at low ISO sensitivity settings. The Leica M9-M is a purely black-and-white digital camera, constructed by replacing the RGB sensor filter found in its M9 sister model with a colorless, optically transparent filter. The resulting images contain only grayscale pixels, giving the camera's firmware more image data per pixel to play with and increasing its effective resolution. M9-M image files measure 5212 × 3468 pixels (i.e., about 18 megapixels). The clear filter also allows more photons through, effectively increasing the sensor's underlying light sensitivity and making it possible to shoot images of acceptable quality at sensitivity settings of up to ISO 10000. The camera is, of course, compatible with the entire legendary range of Leica M-series lenses, which also helps to produce images with excellent sharpness and dynamic range. The downside of all this quality is the price, and the US\$10,500 price tag for the M9-M with a standard lens is definitely pushing into medium-format territory.



Leica M9-M

## » Medium Format

Pricewise, the Hasselblad H4D-40 (see page 18) is positioned between the middle and the lower end of the medium-format scale. Hasselblad offers the H-series body with a 60-megapixel digital back and 80mm standard lens for about US\$30,000. The H4D-200MS model delivers an incredible 200 megapixels of resolution by capturing multiple shots with its 50-megapixel sensor using the patented Multi-Shot capture technology. This technique uses piezo-electric motors to shift the sensor by whole or half-pixel distances within the RGB Bayer filter pattern between shots. This type of camera is often used to capture photos of works of art or motor vehicles that have to be displayed at more than life size.

The highest resolution currently available in a conventional medium-format digital back is the 80-megapixel (10 328×7 760) IQ80 offered by Phase One with a price tag of about US\$40,000 for the back only.

The Hasselblad H4D-40 with an 80mm standard lens like the one we tested costs about US\$18,000, or US\$14,000 if you go for the 30-megapixel H4D-31 version. As a comparison, the 22-megapixel Mamiya Leaf Aptus-II 22 costs about US\$8,500 with a Contax 645AF body but without a lens.

The Pentax 645D offers high-resolution medium-format photography with a full-frame feeling. It has a 44×33mm (40-megapixel) Kodak CCD sensor and is light and compact compared with many other medium-format cameras. Its handling is very similar to that offered by the current K-series APS-C DSLRs, making it easy for experienced photographers to switch formats. At US\$12,000 with a 55mm lens, it is on a price level more comparable with some high-end full-frame DSLRs than with the Hasselblad/Mamiya medium-format segment.

Analog medium-format systems such as the Hasselblad V series can be upgraded using the 50-megapixel CFV-50 digital back for about US\$14,000. The Mamiya Leaf Aptus-II back is available with various resolutions for a range of 80 different medium-format camera bodies and costs about US\$8,000 for the 22-megapixel version for Mamiya 645 or Hasselblad H1 bodies.



Hasselblad H4D-200MS



Phase One IQ80



Pentax 645D



## » Between Two Worlds

Leica's S system is positioned right between full-frame and medium format. The body looks like a slightly oversized full-frame DSLR and contains a 37.5-megapixel sensor that measures 45×30 mm, which is about 60 percent larger than a full-frame sensor. Leica also offers a range of S-compatible lenses with focal lengths between 30 and 180 mm. At US\$23,000, the S2 body is not exactly a bargain, but is nevertheless a sure-fire provider of high-end Leica quality.

The Leica S2's sensor measures 45×30 mm, giving it a classic 3:2 aspect ratio

## » Lenses

The price differential between full- and medium-format lenses is roughly commensurate with the differences between body prices. High-quality Nikon or Zeiss lenses cost about US\$1,000-2,500, whereas equivalent medium-format lenses cost double that and more. Hasselblad's 'standard' 80mm HC 2.8/80 lens is relatively good value at US\$2,600, while the HC 4/120 II macro lens goes for US\$5,000 and the HCD 4/28 ultra-wide-angle comes in at about US\$5,300. Mamiya lenses cost about the same as their Hasselblad counterparts, while Pentax medium-format lenses are a little cheaper but don't have such wide maximum apertures. The Pentax 645D is compatible with older, analog Pentax medium-format lenses, which can often be found at bargain prices on the used market.



The Hasselblad HCD 4/28 ultra-wide-angle has a very wide maximum aperture setting of f4

### See also

Dr. Klaus Peeck, SLR and System Camera test, *c't Digital Photography*, Issue 9, p. 18 ff.

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Torsten Andreas Hoffmann

Relationships Between Shapes

# Composition in Black and White



**A**lthough black-and-white photography has to make do without the richness of the color spectrum, it has always been considered more artistic than color photography. One of the defining characteristics of black-and-white photography is sparing, almost ascetic use of sensory stimuli.

The guiding force behind black-and-white photography is the language of form, which is governed by laws that almost all human beings regard in the same way, for they arise from the way we perceive the world around us. Mastering this language, which inhabits every image like a governing principle, makes it easier to compose powerful images. As you will discover, visual language operates quite differently from spoken language, which is constrained by time and expresses events in sequence.

Visual language communicates directly. In an instant, we comprehend the heart of an image in its entirety. It is less rational than written language, but more emotional and is the ideal medium for expressing emotions. For photographers, this entails relying more on intuition, or 'gut feeling', than intellect.

Nevertheless, we still need to know and understand artistic principles and internalize them by carefully analyzing the results of our own work, so as to become more fluent in visual language. Likely as not, we do not speak it perfectly yet. Cultivating the habit of analyzing your work will automatically help you to create better compositions.

**Taking photos in black and white involves reducing everything to form and tones of black, white and gray. But how do you create tension in an image? Which rules apply to the composition of black-and-white photos? The examples and discussion in this article will help you produce more professional-looking monochrome images.**

## A New Way to Look at Things

Those new to black-and-white photography are frequently disappointed because they still think in color rather than in black and white.

Reality clothes itself in many colors: the 'blue hour' just before sunrise or just after sunset has a magical effect, with the sky glowing

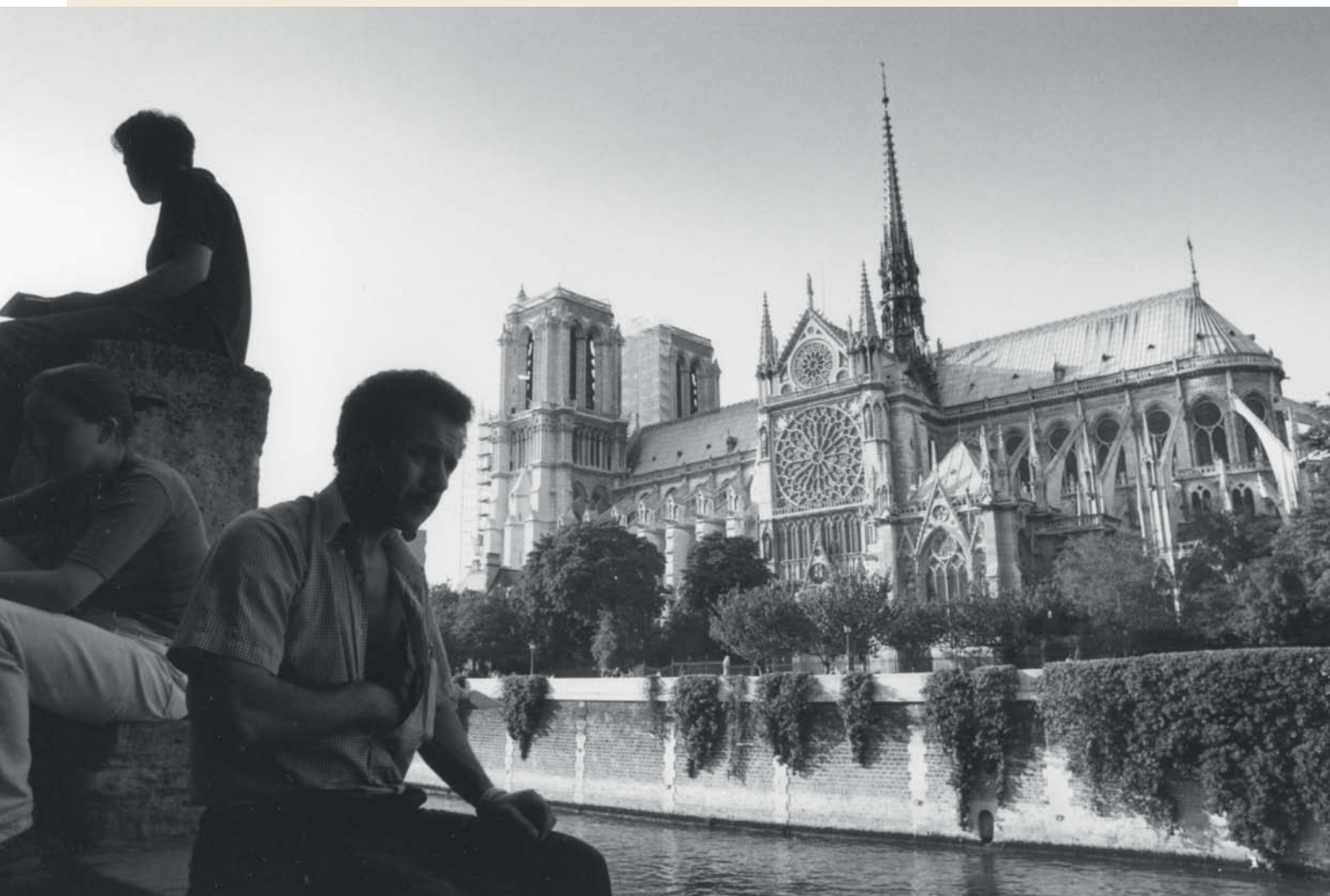
orange above blue-tinged buildings and countryside. But beware of all this bewitching color. All too easily, we forget that black-and-white photography translates colors into nothing but gray values. This fact calls for a rethink and a fresh artistic take on what we see. Instead of expressive colors, we have to work with lines, textures and shapes to bring vitality to our photos.

If you are still feeling your way, it can be a good idea to make an occasional exposure in black-and-white mode to help you see what the subject looks like in black and white. But remember to switch back to color mode straight away and create your monochrome images by converting them from color. This way, you will have many more processing options – such as color filter simulation – at your disposal.

Notre Dame in the setting sun (above right). Against the background of a glowing orange sky, the cathedral and the bridge are bathed in a violet so enchantingly beautiful that it verges on being overly sentimental. In black and white, the same image comes out a disappointing dirty gray, with not even a hint of the original fairy-tale feeling. To photograph Notre Dame in black and white, we have to look at it completely differently.



The solution (below): The three men create a shape that stands out against the sky – a complete contrast to the architectural structure. Their almost black silhouettes impart strength, contrast and tension to the black-and-white image.





## The Right Light

**Black-and-white photographers have to embrace the mystery of light. Of all the aspects of photographic composition, the relationship between light and shadow is perhaps the most important.**

Understandably, light is a very important factor in composition. To capture it in color, it is best to shoot early in the morning or in the

late afternoon and early evening, when light has its warmest color temperature and is at its most atmospheric. The middle of the day is a bad time to take color photos, because the light has a cool, clinical feel. However, you can take black-and-white photos at any time of day, because they depend more on the interplay between light and shadow than the color temperature of the light they contain.

The sky is often crucial to creating a certain lighting mood, so you need to take careful note of sky and cloud formations and include them in your composition, especially when photographing cityscapes and landscapes. In backlit situations, polarizing and graduated filters can heighten the magical effect of the ambient light.



The wonderful Piazza Colonna in Palermo with its many statues can create a 'ghostly' feel if captured in the right light, as shown in the photo below. The composition of this photo is particularly intriguing because the upper bank of clouds mirrors the crescent-shaped view of the piazza. An untrained observer would probably not have noticed this correspondence between two elements in the image, but it is one of the keys to the orderly look of the photo and therefore crucial to its composition.



## Image Composition

The visual content of any good photo is based on an abstract structure, a pattern of some kind. It is this pattern that determines whether the image looks interesting or lackluster, chaotic or orderly.

The same artistic rules that apply to painting also apply to photography, although photographers have to work quite differently

from painters, because they cannot simply invent their subjects or arrange them any way they like. Instead, they have to select from what is available, and seize the moment using a powerful composition and a wide frame (i.e., a wide-angle lens), a medium frame (a standard lens) or the small frame created by using a telephoto. Consider every photo critically and ask yourself, would a painter have composed a painting in the

same way? Is there anything distracting or superfluous in the photo? Are there elements that detract from the main message? The quality of a photo is determined to a very large extent by the way the individual elements relate to each other. Often all it takes to transform a weak image into a powerful one is simply to step a few meters to the left or right, to bend down a little or to use a different lens.



The distribution of the hay bales within the frame makes the photo above balanced and interesting, while the one on the left appears not to have been composed at all and is quite dull. The arrangement of the hay bales, their differing proportions and the unusual shapes of the trees on the horizon create agreeable visual tension. The line of trees is an important element, and is based on the basic framework of elements that governs the golden ratio (see the next page).

## The Framework of an Image

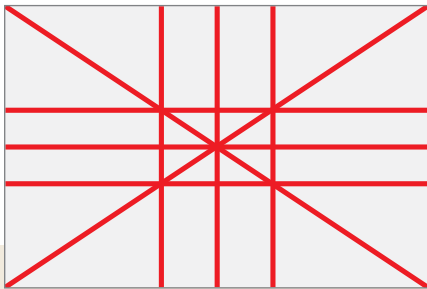
The 'golden ratio' has been used since the times of the Ancient Greeks to describe particularly harmonious proportions in the layout of an image. The golden ratio creates a framework of elements which form the basis of many well-composed images.

Good image composition involves arranging the visual elements within the frame in such a way that the viewer experiences both harmony and visual tension, but not monotony.

One particularly harmonious visual arrangement is the ratio 1:1.618, also known as the golden ratio. If you divide a straight line using this ratio, the relationship of the longer part to the shorter part is the same as that of the longer part to the entire line.

Along with its two axes of symmetry, the lines that divide an image vertically, horizontally and diagonally using this ratio (i.e., roughly 5:8) form a basic framework that can be used to aid photographic image composition (see the diagram below).

However, care is required when using these lines to compose an image, and adhering to them strictly can produce images that look rather static. Aligning some but not all of the individual elements in a photo with some of these lines helps to achieve a clear, well-structured visual impression. Advertising photographers often use this framework to compose their images, making the results easy to interpret quickly – an important consideration when shooting photos for billboards.



Comparing these two photos shows how subtle but effective use of the framework created by the golden ratio can be. Placing the horizon in the center (above right) makes the dark sky look too heavy because it takes up more of the space within the frame. Both photos were taken on a beach in Ireland with a 200mm telephoto lens and were deliberately underexposed to prevent the highlights in the ocean from burning out.



## Static and Dynamic Composition

If an image is oriented to the vertical and horizontal lines of the golden ratio's framework, it is generally considered to be 'static'. If it is oriented to the diagonals or other slanted lines, it is referred to as 'dynamic'.

Static compositions are usually shot using telephoto lenses. In architectural photography, for example, static composition

ensures that almost all the visible lines are vertical or horizontal. Wide-angle lenses achieve the opposite, and produce oblique vanishing lines and distort the look of a building if you don't take care to position the image plane perpendicular to its surface. Wide-angle lenses are a great tool for creating dynamically composed images.

Static images are easier to recall. As an experiment, have your friends look from behind through the focal plane shutter of an

analog camera (without film inside) set to 1/60s. Place a statically composed image in front of the camera followed by a dynamically composed one. Your friends will most likely be able to tell you what they saw in the first image (in spite of the very brief viewing time), but not what the second image showed.

Contemporary documentary photographers often combine dynamic compositions with motion blur to create edgy, energetic images depicting troubled or troubling subjects.

The image on the right shows a typical dynamic composition, oriented primarily to the positive rising diagonal of the golden ratio framework, but also to other oblique lines. In this case, the composition emphasizes the subject's movement and creates an impression of speed and energy without any obvious points of stability or calm.



This view of Midtown Manhattan is a typical static composition that emphasizes the two horizontal golden ratio dividing lines. The horizon is on the lower horizontal line and the bottom of the blind is on the upper one. The rest of the image comprises almost entirely vertical and horizontal lines. A static composition like this emanates stability and calm.

# Super Signs

Specific shapes embedded in the content of an image, such as the triangular shape in the image below are known as 'super signs'.

Super signs are usually only perceived subconsciously. People are not usually aware of them when looking at an image, but they are nevertheless very effective – a phenomenon that the advertising industry often puts to good use. An isosceles

(or right-angled) triangle is one of the best-known super signs, and is a particularly good shape for creating visual harmony. Roofs in classical architecture are often constructed using Isosceles triangles as their basic form.

Triangular photographic super signs can be either clearly defined or simply hinted at. Like the golden ratio, super signs order an image and give it a harmonious feel, although again, overuse can produce inert-looking images.

Caspar David Friedrich, a German Romantic landscape painter, incorporated triangular shapes in many of his famous paintings, especially in cloud formations.

The art of great image composition is to integrate such visual elements into an image so that they have a positive effect while remaining just below the threshold of people's conscious awareness.



The easiest way to create a triangular composition is by using the vanishing point created by almost any path or road. If you position yourself in the middle of a relatively straight road, one-point (or 'vanishing point') perspective will almost always make the road appear to form an Isosceles triangle – provided you don't use too powerful a telephoto lens. In the photo on the left, the sandy ground between the two freshly surfaced lanes of a freeway creates exactly this kind of triangular motif.

Artistically speaking, this image derives its spark from the imperfect symmetry caused by the vanishing point disappearing right of center and from the varying distances to the approaching camels. If the image had been composed so that the two vertical halves mirror each other symmetrically, it would have appeared rigid and lifeless.

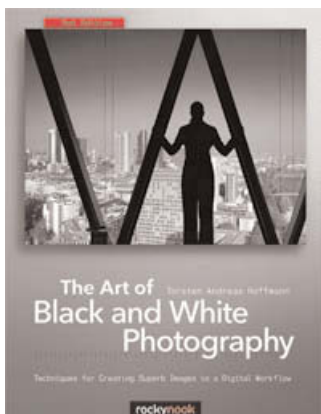
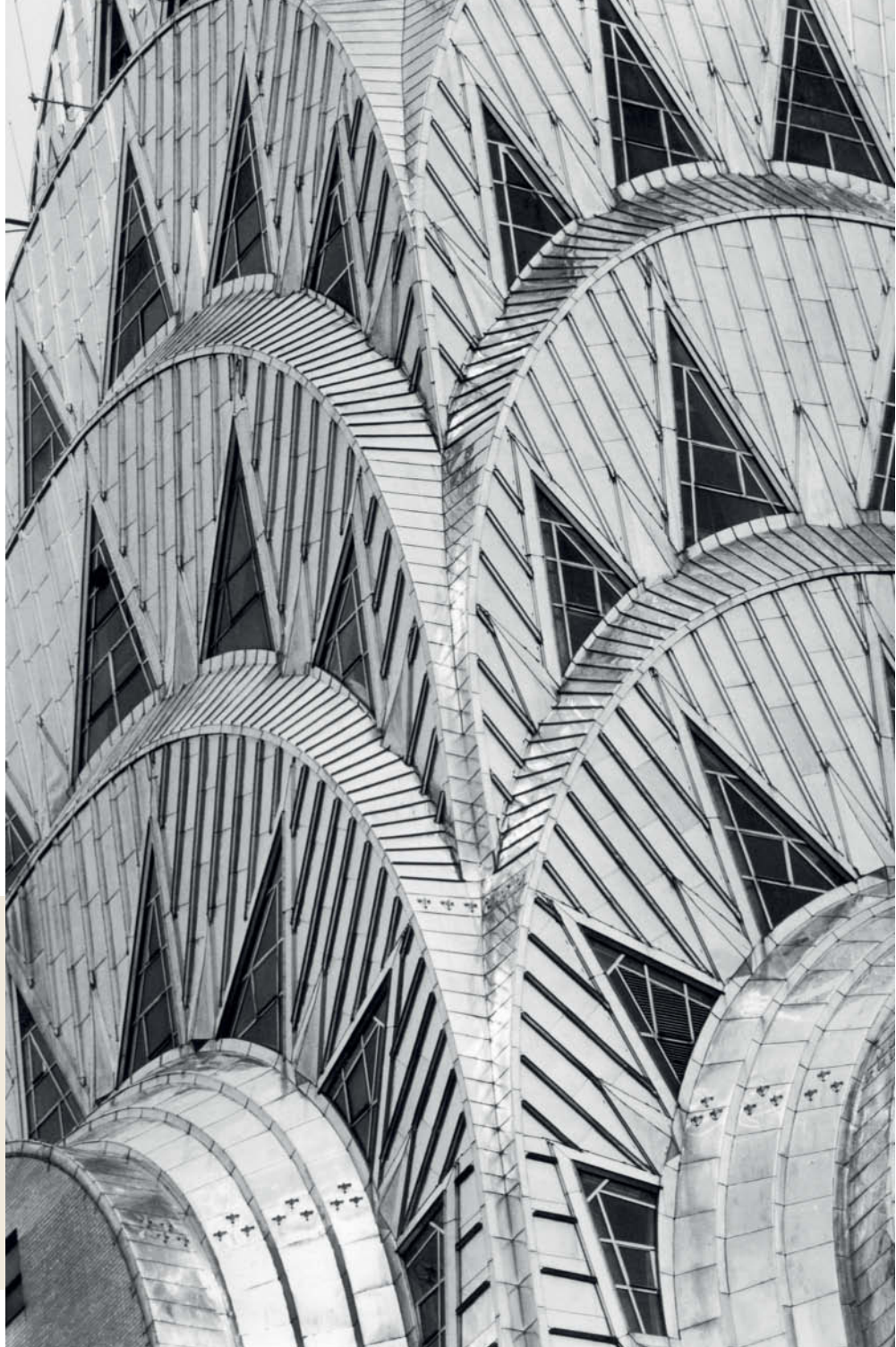


## Image Rhythm

Just like a piece of music, an image can have its own innate rhythm that determines its basic structure and the way space is allocated within the frame.

Rhythm generally refers to the recurrence of similar patterns. In music, this obviously refers to the tempo and rhythmic structure dictated by the composer, whereas in nature, it may be the changing seasons. In order to bring rhythm into a visual composition you have to view its content in an abstract way and learn to use the language of form so that you can play it like a musical instrument. Rhythm in photographic images means including similar, repeated elements within the frame. Constant repetition of just a few, similar elements makes an image much more powerful.

In this photo of the top of the Chrysler Building in New York, the rhythm comes from the repetition in the small triangular windows, the lines that surround them and the arches that extend left and right like palm leaves. The visual tension is created by the differences between these rhythmically repeated visual elements.



## The Art of Black and White Photography

Rather than simply explaining digital technology, *The Art of Black and White Photography*, published by Rocky Nook, emphasizes the intrinsic and artistic aspects of photography. Among his many topics, the author explores architectural,

street and surreal photography as well as the art of photographing people.

Price: US\$44.95

ISBN: 978-1-933952-96-3

[www.rockynook.com](http://www.rockynook.com)

## Tips for Shooting Better Black-and-white Photos

1. Shoot in color and convert your images to black and white later.

2. Shoot in RAW format. Among its many advantages, RAW provides better tonal gradation and less noisy sky during conversion to black and white.

3. Use a polarizing filter rotated to 90 degrees in sunlight and lateral light. This increases the contrast between the clouds and the sky.

4. Use a two- or three-stop graduated gray filter when shooting the sky in backlit situations. This evens out the extreme differences in lighting between the sky and the foreground or background.

5. Converted black-and-white images require increased contrast in comparison to their color originals.

6. If you convert your images using *Photoshop*, be sure to try out the built-in color filter functions. The Yellow filter

preset, for example, gives landscapes a mystical air.

7. When processing, work on one part of the image at a time, and use the Dodge and Burn tools to brighten or darken selected image areas. Or better still, select the parts of your image that are too dark or too bright using the Polygon Lasso with a feather setting between 100 and 250 pixels before performing any adjustments (brightening, increasing contrast etc.).

## Image Tension and the Center of the Frame

**A mistake that beginners often make is to place the subject in the center of the frame. This often produces dull photos and is a waste of a great opportunity.**

The way modern cameras are constructed tempts us to place the subject in the center of the frame, but there are often other, better ways of composing an image and creating tension. Every photographer should

practice deliberately positioning the main subject of a photo at the edge of the frame while searching for a counterpoint to place in the opposite corner (see the photo overleaf).

It is not always wrong to place the subject centrally, but if you do, make sure the rest of your composition matches, perhaps by using vanishing-point perspective. The effectiveness of this type of composition

comes from the fact that it draws the viewer into the center of the image.

Compositions that emphasize the center of the frame automatically utilize the power of symmetry. Symmetrically composed images often have a powerful, traditional feel, but can be quite stiff and static. As a rule, the farther the composition takes the emphasis away from the center of the frame, the more unconventional its effect will be.



This portrait of an Indonesian rice farmer was composed deliberately with the subject's face in the center. The nose accentuates the vertical axis of symmetry. A centralized, symmetrical composition like this underlines the archaic effect of the image – an effect that can be used to give a subject a spiritual or almost sacred look.

It is the visual tension between the two monks that makes this image come alive. The monks were deliberately placed at the extreme right and left of the frame and are even slightly cropped. This leaves most of the frame quite empty and bathed in blur. Nevertheless, the intense eye contact between the two subjects completely fills the frame. The photo was shot at a Buddhist monastery in Nepal.







## Balancing an Image

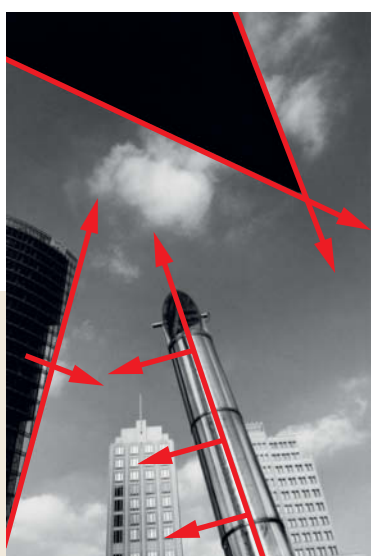
**Statically composed images are usually automatically balanced. When composing images dynamically, however, it is important not to lose your artistic balance.**

We have seen that a considered composition gives a photo interesting, sometimes abstract foundations. This basic structure can take on many forms oriented around the golden ratio,

using super signs, or based on static, dynamic or rhythmic patterns.

One thing is true no matter which type of composition you opt for: the basic structure that underpins an image must be in balance and shouldn't 'tip' too far in any direction. The visual rules governing various formats predetermine the outcome to a certain extent: the familiar horizontal landscape format tends to produce static-looking

images, while portrait-format images are more dynamic, and are more susceptible to becoming top-heavy. Combining portrait format with a dynamic composition often produces an overall image structure that can quickly get out of kilter. If that happens, it is often difficult to judge image balance just by looking through the viewfinder, and you will need to make some test shots to help fine-tune your composition.



This photo is a dynamic composition, invigorated by a large number of slanting lines. Due to the use of a powerful wide-angle lens, almost all the basic shapes and lines are on a slant, yet the image is balanced. All the leaning buildings create movements that balance each other out (see the red lines in the diagram above). The tall building at the extreme left of the picture, although 'falling' to the right, is counterbalanced by the air shaft in the center, which is leaning to the left. Since both of the buildings at the bottom are leaning slightly to the left, the composition needs something to counteract this movement. This is provided in the form of the right-leaning pointed black triangle at the top. The overall result is a well-balanced picture.



## About the Author

Torsten Andreas Hoffman was born in 1956 in Düsseldorf, Germany, and trained as a photography and art teacher at the Institute of Fine Arts in Braunschweig. Photography has taken him to India, Indonesia, Mexico, Nepal, Turkey, the United States, the Sahara and the United Arab Emirates. His work has been seen in numerous exhibitions at high-profile

galleries and in more than 20 coffee-table books. He has been published in German magazines like *Geo*, *Merian*, *Chrismon*, *Photographie*, *Schwarzweiss* and *mare*, as well as in international magazines such as *Digitalis Foto* in Hungary. He has worked extensively in New York and has published two art calendars and three books of photos of the city

Hoffmann is a member of the LOOK and BBK photo agencies and was appointed a member of the German Photographic Society (DGPh) in 2006. He lives in Frankfurt am Main and Goslar. He was nominated for the German Photo Book Prize in 2008 and won a Silver Medal at the International Calendar Show in 2009.



If we crop the photo from the preceding page, it appears to be leaning toward the left, although it remains balanced (above). Now, if we flip the cropped photo, we make an amazing discovery: the result (shown on the right) feels much more out of balance than the original photo. The explanation for this subjective impression is simple: in the Western world, we 'read' images from left to right. This means that the 'tip' in the original image is counteracted by the movement of the viewer's eye from left to right, while the flipped photo tilts completely out of balance.



## The Quest for the Essence of a Subject

**Another mistake that beginners make is trying to cram too much into a photo. It is always worth taking a 'less is more' approach to image composition.**

Reduction is an important creative tool in contemporary art. Piet Mondrian, like many other painters, moved farther and farther away from the world of complex images toward ever simpler forms. The Russian artist Kazimir Malevich painted the first monochrome painting at the turn of the 20<sup>th</sup>

century. This approach is also seen in contemporary photography: Japanese photographer Sugimoto created a series of marine images in black and white in which the only contrast to the monochrome sky is the sea. Sugimoto reduces his compositions even farther by positioning the horizon in the center. This is a great example of how you can break the rules once you have learned them. It is a very useful exercise to limit your compositions so that they contain a minimum of elements.

The best way to get to that point is to follow Andreas Feininger's advice and "explore the subject". Say you want to photograph an interesting house: Feininger's recommendation was to walk right round the house first to discover the angles from which it reveals its true essence. It always pays to give yourself plenty of time to take your photos, and to spend enough time looking through the viewfinder in order to reduce the subject to its essence.



The essence of these dunes in the Sahara is their serpentine flow and the interplay between light and shadow. To really bring this out, the photographer had to wait until just before sunset and then search the view until a clear composition that captured the essence of the desert became apparent. In the final image (right), the three prominent curves and their shadows 'make' the picture, depicting a clear, reduced form. The smaller image (above) lacks this clarity and reduction. The sheer breadth of the scene is clearly evident in the photo on the right without actually becoming the main theme. These two photos were shot using a 28mm lens within 20 meters and an hour of each other.



## Sensing and Capturing Atmosphere

A really successful photo is not only well composed, but also has a 'certain something' that expresses the way the photographer experienced the scene. The vitality that a photo projects is connected with the inner energy that you tap into during the shoot.

There is little point in taking a purely analytical approach to black-and-white photography. On the contrary, renowned black-and-white

photographer Robert Haeusser is absolutely right when he recommends that photographers should travel the world and seek out the places that truly interest them. He believes it is essential to break free from the idea of working through a conventional list of 'must-see' attractions. Instead, follow your instincts like a divining rod and allow the camera to linger where it wants. If your gut feeling tells you to photograph a ramshackle backyard, it is perfectly OK to ignore the

magnificent building opposite. Potent photos will only ever come from places that conjure up genuine enthusiasm.

It is impossible to explain why this is so, but it is nevertheless one of the secrets of great photography. Applying technology and the rules of composition has to become second nature if you are to create truly great images, but these tools are nevertheless just the icing on the cake of a photo shot with real conviction. (keh) **ct**



Black-and-white photography finds its voice thanks not only to graphic lines, but also to strong contrasts and deep black shapes. Take these photos of a village in Sicily, for example. The one on the right is lifeless because the tonal values are distributed too evenly throughout the frame. The solution is to embed the same composition in the deep black frame of a wall in the foreground. The resulting image (above) radiates a lot more energy because the blackness of the wall creates the impression that the village is glowing. These images clearly show how only a few steps or a few seconds can make the difference between a powerful photo and a lifeless snapshot.





Doc Baumann

# The Big View from Below

If you want to make small objects loom large in a montage, you have to photograph them with the end result in mind. This workshop explains what to look out for when shooting and processing images shot from a low viewpoint.

Occasionally, we come across montages in which small objects look much larger than they actually are – a toy dinosaur inserted into an image to look as if it is on the prowl between skyscrapers, for example. Sometimes, shots like this fail due to the incorrect direction of the incident light, differences in surface texture or inappropriate shadows, and many don't work because the perspective of the source image simply doesn't fit with that of the new background.

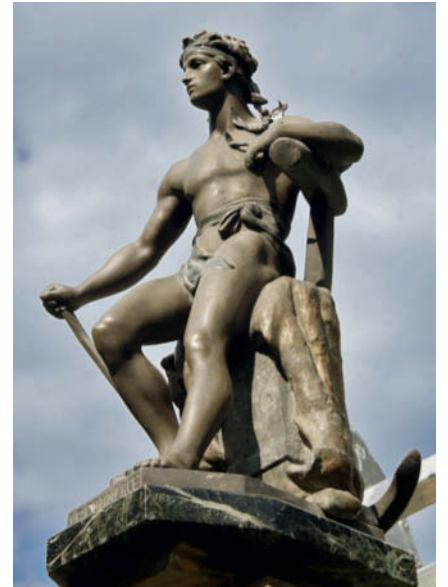
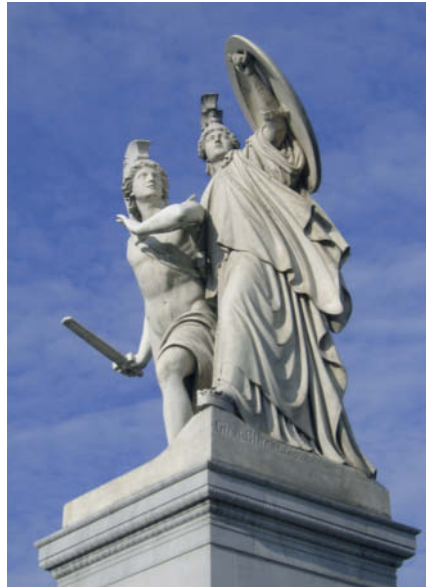
Usually, you only see the parts of a statue like the one shown here that are visible from the front at eye level. You view the foot of the pedestal from above and, logically, you look up to view the statue located on top of it. The simple conclusion to be drawn here is that in order to make small objects appear larger than they actually are, you need to photograph them from below – or, in other words, from the position you would have to be in to view an object that really is as large as you want to make your subject look. If you shoot with your camera positioned on the ground, you will unavoidably leave the lower parts of your subject out of the frame. This means it is necessary to go a step further and ensure that you can photograph your subject from below its base level. The following pages describe some examples of this type of image and give some useful tips on how to shoot and manipulate them effectively.



This is the original image – the montage is shown opposite

Our tip: **A suitable shooting angle** helps to make a montage look realistic. Decide in advance which background you want to use (in this case, the pedestal), and adjust perspective in your source image appropriately. The shooting angle for the statue in the far right-hand montage shown here was too flat, and makes the statue appear to tip forward. In the other example, it was too shallow and makes the statue appear to tip backward.





### 1 Replacing the statue in a classical sculpture

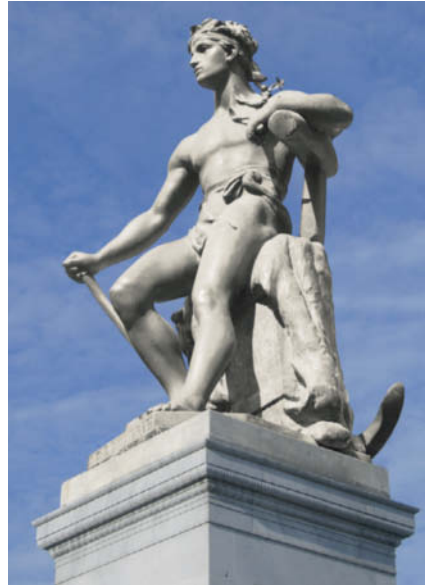
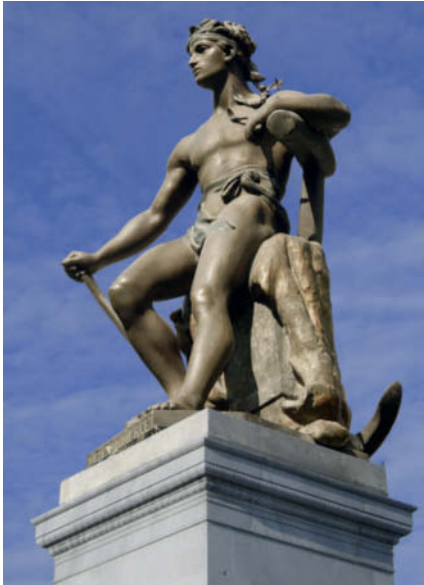
Our tip: To achieve the **correct perspective**, take a print of the background image with you and draw in the angle you wish to duplicate (see below). In this case, the square pedestal makes it relatively simple to compare angles and shoot appropriately.

The large, classical sculpture on the left is located on a bridge in Berlin. The bronze figure on the right is only about 40 cm tall and was set up so that the direction of the incident light was virtually identical to that in the original image. To achieve the correct shooting angle, I put the figure on a piece of board balanced between the rungs of a ladder and shot lying

on the ground looking upward (keeping my fingers crossed that the figure wouldn't topple off its perch in my direction). It is always tricky to precisely judge shooting angles while looking through the viewfinder, so it is a good idea to take several versions of shots like this at slightly different angles and with slight variations in the horizontal camera position.







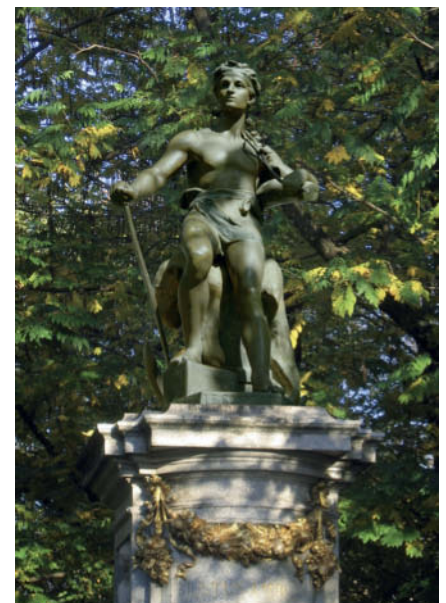
## 2 Inserting and adapting the new object

The next step is to fill the background around the inserted object – for example, using Layer > Fill > Content-aware (see the tip opposite). The selected replacement figure is saved on the clipboard. The pedestal in the original photo is then selected and the selection inverted before using Edit > Paste Special > Paste Into to insert the statuette. This step

automatically creates a layer mask that hides the pedestal. The mask is not linked to the layer's own pixels, so we can move and scale it at will to locate it behind the pedestal. Once these rough adjustments have been made, we can fine-tune the image and make any necessary color changes.

## 4 Making sure the surroundings look right

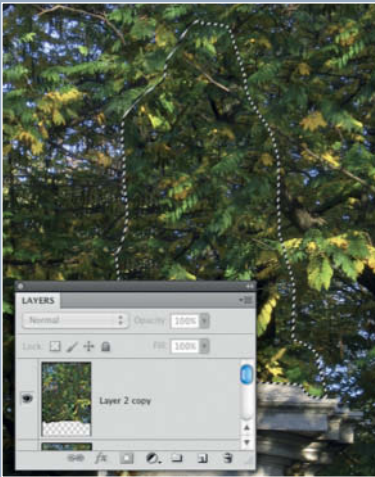
The charm of this example lies less in matching perspective and more in the challenge of harmonizing the lighting conditions in the two images. We could have reproduced the shadows of the leaves digitally on a separate layer, but it was much simpler to photograph the statuette under a fruit tree and directly insert the resulting selection. We also experimented with the color of the light to account for filtering and reflections caused by the leaves. Although the statue in the original image (above) displays no obvious green tones, we found that using the Image > Adjustments > Match Color command helped to give the finished image a more cohesive look.



## 3 Extreme Worm's-eye View

Our statuette's square baseboard doesn't help if the original image was shot from a frontal frog's-eye viewpoint like the one shown here. In this case, there are virtually no tangible elements that can be used to directly compare the two images, so we have to judge perspective by eye. The alternative is to measure the distance and the angles involved by hand – although I am fairly sure

that I would have provoked some opposition if I had tried to lean a ladder up against the monument to Giordano Bruno on the Campo dei Fiori in Rome (on the left) and attempted to measure it with my carpenter's rule. In this case, even the photo taken from the steepest possible angle wasn't sufficient to produce a realistic-looking montage (on the right).



Our tip: **Content-aware Fill** is an impressive tool that was introduced with *Photoshop CS5*. Any anomalies it produces in the resulting image areas can be easily repaired using the Stamp tool. Make sure that you only select areas that you really want to fill, as the tool also takes 'inappropriate' neighboring pixels into account (see below). If we exclude the pedestal completely, only the sky is used for the fill (bottom).



## 5 Do-it-yourself Mountains

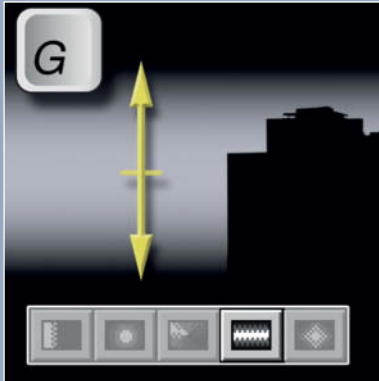
We were able to use the outline of the castle and the pine forests surrounding it as a hard border between the foreground and the background, but we used a mirrored soft transition to separate Rome from its new surroundings. Applying a slight soft focus effect to the 'mountains' makes them look

more realistic, and the overall feeling of depth can be enhanced by brightening the scene slightly, reducing contrast and adding a slight blue tone. Finally, we used the *Photoshop Puppet Warp* tool to correct the tip in St. Peter's Square caused by the wide-angle lens used to take the original photo. (jr) **ct**





Our tip: The best way to produce a **misty transition** is to use a reflected gradient drawn vertically with the help of the Shift key on a separate upper layer. The gradient and its layer mask are easier to see against a black background than they are against the real Berlin skyline (below).





Alexander Jansen

## Making the Most of **Handheld Long Exposures**

This article explores the fundamentals of marksmanship and how they can be applied to improving your photographic technique, especially when shooting long exposures without a tripod. With a little practice, the tips and tricks outlined here will help you to learn how to remain flexible with a camera in your hands and will help you to instinctively take on stable shooting positions.



Recently, a photographer friend expressed his frustration with electronic vibration control systems – they are a fine invention, but simply cannot replace a steady hand. This article provides a unique, in-depth tutorial on how to improve your physical technique for shooting handheld long exposures.

Although my friend was referring to shooting 1/8-second shutter speeds using a medium (70-200mm) telephoto lens, I have produced great results at 1/4s with my 80-450mm (equivalent) lens set to its long end, admittedly with shake reduction

enabled. The following pages take a look at how marksmanship training can be adapted for use in the world of photography, and will teach you how to 'shoot' your camera like a high-end rifle. At the end of the day, the fundamental approach is the same in every respect. If you have already learned how to shoot a gun, you will probably do many of the things we will be discussing without even thinking about it: position, breathing control, aiming and sight picture and, of course, shutter squeeze. Let's take a look at the details.

## In this article

Hand, Elbow, and Standing Positions	70
Kneeling and Sitting Positions	72
Bracing Techniques	74
Breathing Control, Aiming and Shutter Squeeze	76
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# Hand, Elbow, and Standing Positions

If you hold the camera correctly, you can use surprisingly long exposure times in a standing position without producing unwanted blur. In these cases, an important and often underestimated factor is the way you position your arms.

## Hand Position

For the sake of clarity, the explanations on the following pages assume that everyone shoots right-handed in accordance with the ergonomics of most currently available DSLR cameras.

When you shoot normally (i.e., using exposure times of 1/50s and faster), you won't have to follow these particular tips quite so stringently and the majority of the camera's weight will be supported by your 'trigger' (i.e., right) hand. More specifically, the center of mass (i.e., center of balance) of the camera is at the body end. This is why long lenses that require the use of tripod collars – 400mm primes, for example – have their collars positioned way out toward the front element of the lens. Basically, you use your right hand to support the weight of the camera/lens and your left hand to zoom and/or focus, but primarily to aid stabilization. In this case, your left hand actually bears very little weight.

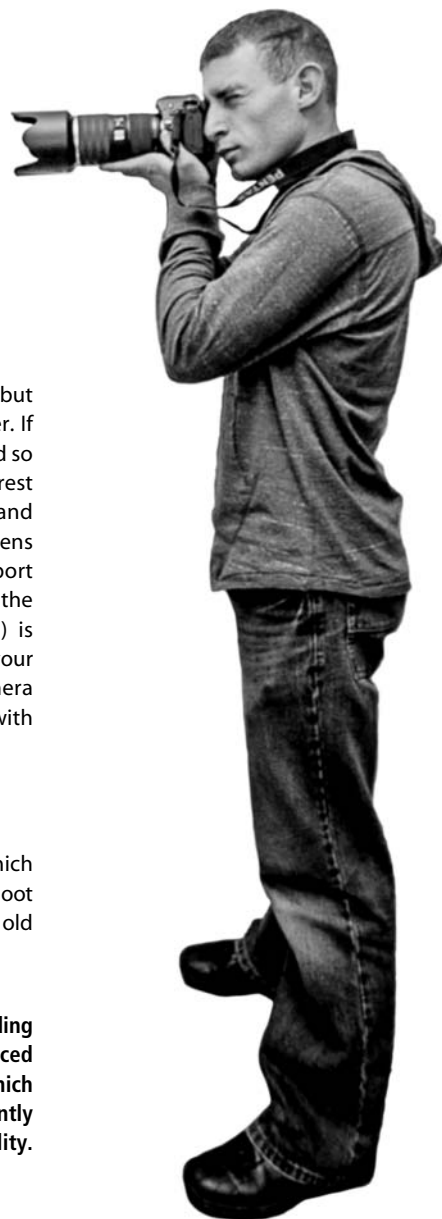
When applying these fundamentals to slow, handheld exposures, you have to switch the basic position. This means that your left arm supports the weight of the

camera – not only by keeping it elevated, but also by pulling it tight into your shoulder. If your lens is large enough, open your hand so it is palm up and allow the lens barrel to rest on your open hand. The heel of your hand should be positioned just in front of the lens mount, so that your main point of support (think of the part of your hand that bears the most weight when you do a push-up) is under the camera body itself (fig. 1). Use your trigger (shutter) hand to pull the camera back until it presses firmly on your face with your eye positioned at the viewfinder.

## Elbow Position

Unlike the old John Wayne movies in which they have you believe the proper way to shoot is with your elbow cocked to the side (an old

**Fig. 3:** This is a free-standing position. It differs from a braced position (see page 74) in which your legs don't significantly contribute to your overall stability.



**Fig. 1:** Use your left hand to support the weight of the camera and, if your lens allows, rest the lens barrel on the palm of your open hand. The heel of your hand should be positioned just in front of the lens mount.

Army doctrine) it is, in fact, more effective to point both elbows downward and pull them in tight to your body. Once again, if you are shooting using 'normal' exposure times, you should use whichever shooting position is most comfortable.

Figure 2 illustrates the hand positioning described earlier. My hand is open and elongated along the entire length of the lens starting with the heel positioned where the camera body and lens meet. Leaning down a little and pointing your elbows in toward your stomach further restricts vertical movement and provides added stability.

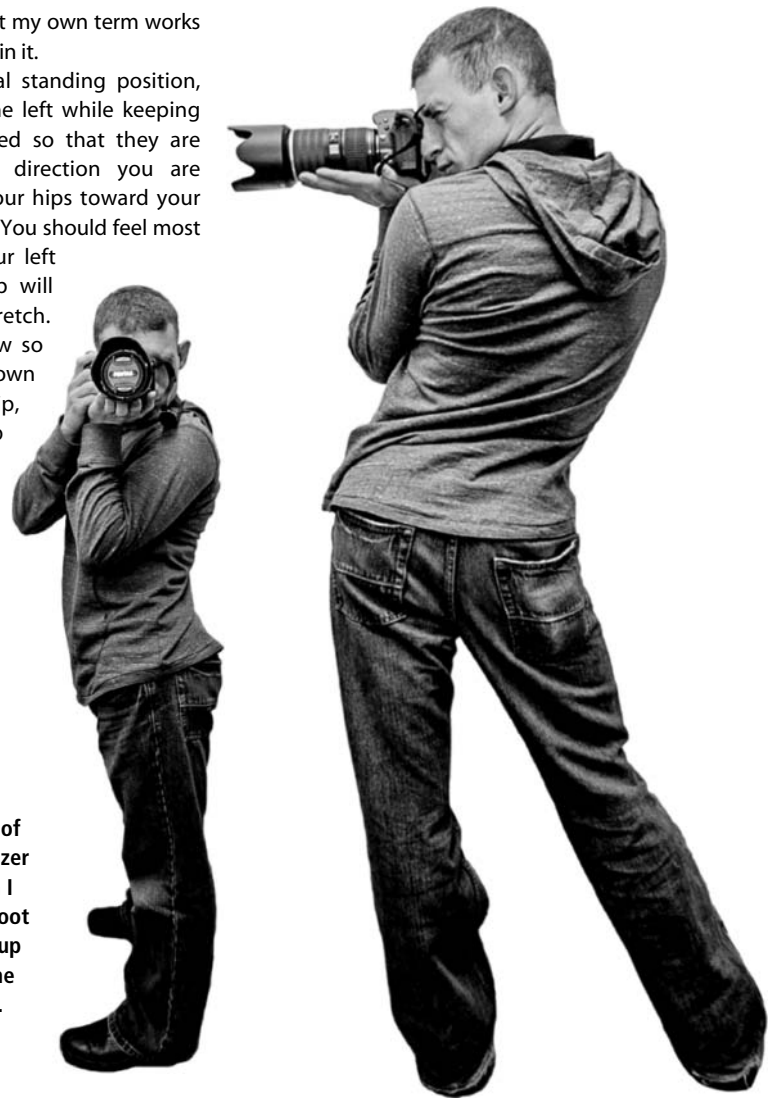
### Standing Position

When there is nothing to brace against and you have to stand, arch your back a little (if you are familiar with weight training, think Olympic lifts), and lean into the camera, as described for 'Sitting Positions' below. This is a very stable position. My feet are spread slightly wider than shoulder width, and my training in boxing and mixed martial arts has taught me to take on a 'lower and wider' default stance than I would otherwise adopt. You may find that spreading your feet even wider proves to be more stable or comfortable, which in turn leads to more stability. Experiment with both.

Another version of the standing self-stabilizer was taught to me when I was learning how to shoot long distance (300m and more) standing up with a rifle. I prefer this position for technical reasons (not just because it makes my butt look fantastic), and I call it the "Torso-Turn-Hip-Point" (fig. 4). I don't know the

correct terminology, but my own term works for me as a way to explain it.

Starting in a normal standing position, rotate your torso to the left while keeping your feet firmly planted so that they are perpendicular to the direction you are 'aiming'. Then point your hips toward your 'target' (i.e., to the left). You should feel most of your weight on your left foot and your left hip will experience a deep stretch. Tuck in your left elbow so that it points directly down to your left hip, remembering to keep your arm flush against your body.



**Fig. 4: Another version of the standing self-stabilizer was taught to me when I was learning how to shoot long distance standing up with a rifle. I call this the "Torso-Turn-Hip-Point". It can be tricky to learn but is worth the practice.**



**Fig. 2: The left-hand photo shows the position my elbows naturally take on, whereas the one on the right shows the technique I use when I am shooting to get the most of the available light using long exposures. In this case, my elbows are pointed downward and my forearms are resting on my chest.**

# Kneeling and Sitting Positions

Every photographer should master kneeling and sitting positions. It is important to remember that you can only hold your camera steady if you position your body effectively first.

## Kneeling Position

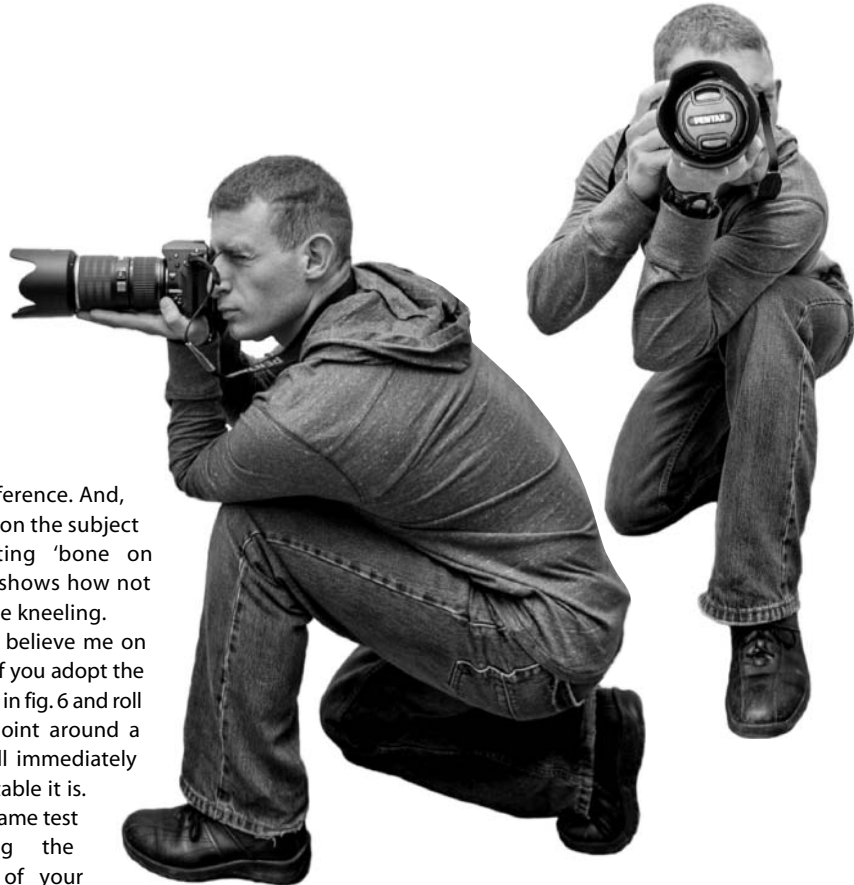
Let's imagine the weather is fine and that there is no danger of dirtying up your slacks, so we can practice 'taking a knee'. The basic kneel position is shown in fig. 5.

Note how my left arm supports the weight of the camera and is itself supported by my left knee, which has a strong, flat-footed 90 degree plant on the ground. Notice as well how far forward I am leaning. The elbow position is one aspect of a kneeling position that a lot of people get wrong. Note that my elbow joint is not resting directly on my knee – instead I have the meaty part of the back of my arm (the tricep muscle) resting on my knee. Some people prefer to point their left arm straight forward rather than canted toward the inside like mine, but this is a matter of

personal preference. And, while we are on the subject of not putting 'bone on bone', fig. 6 shows how not to shoot while kneeling.

Don't just believe me on this – test it! If you adopt the stance shown in fig. 6 and roll your elbow joint around a little, you will immediately see how unstable it is. Now do the same test after resting the meaty part of your triceps on your knee as depicted in fig. 5.

There are two positions for your back foot. You can either leave it free or let your weight settle and sit on it. The latter position is technically more stable, but I find it



**Fig. 5:** Kneeling position. The left arm supports the weight of the camera and is supported by the left knee, which has a strong, flat-footed 90-degree plant on the ground.



**Fig. 6:** Some people prefer this direct elbow-to-knee position, but it simply isn't useful in photographic situations



**Fig. 7:** You can either use your back foot as a free-standing support point (left) or lay it flat and sit on it for extra stability (right)





uncomfortable. I like to lean forward when I am kneeling and I can't do this comfortably while sitting on my foot. Again, experiment with both positions – you will quickly find out which feels more natural to you.

### Sitting Position

The sitting position is intrinsically more stable than standing or kneeling because your center of gravity is lower and more of your body (your 'fourth point of contact') is in contact with the ground. This position is also less obtrusive if you wish to remain unseen.

Sometimes you simply cannot adopt a standing position. I found myself in this situation while attending a Cirque du Soleil performance. It was dark and I was in the middle of the audience, so I couldn't stand up or get up on one knee and simply had to deal with the situation as it was. But that is the beauty of knowing about all these different, stable shooting positions – you remain flexible and you can choose the position that works best in any given situation, thus making you a more adaptable (and successful) photographer.

As with the kneeling position, when sitting you should avoid bone-to-bone contact. The only difference here is, instead of resting your triceps on your knee, you need to rest both elbows on the meaty part of your calves. You can also go above the knee and put your elbows on your thighs, although I prefer doing it the way I have shown in the illustration because, once again, it allows me to 'lean into the camera'.



**Fig. 8:** The sitting position is the most stable of all, and I can use it all day long. Instead of resting your knee into your triceps, you rest both elbows in the meaty part of your calves.



**Fig. 9:** To further maximize stability, put your feet together and rest your forearms along the insides of your legs. And, if you are ready to go the extra mile, you might like the increased stability provided by leaning completely forward.

To further maximize stability (or if you found yourself asking, „What calves?“), put your feet together and, instead of putting your elbows on your calves, rest your forearms along the insides of your legs.

Notice it is no longer your elbows, but instead your triceps resting on your shins that

give you support. Note also that in this position, my back takes on exactly the same shape here as it did in the kneeling position. The fundamentals remain the same throughout. I know this is getting monotonous, but there is nothing the military does better – repetition, repetition, repetition!



**Fig. 10:** Maximum stability in a sitting position is achieved by leaning forward. In this position, the major source of support is the contact between your triceps and your shins.



# Bracing Techniques

This section focuses on several different ways to brace your camera and/or yourself against the different features of the terrain you are shooting in. Bracing is a real help, but the individual approach you take will depend on your location and your current shooting position.

## Wall Lean

Let's assume that you are in an indoor situation in a 16th century basilica and you can't get the organ pipes to stop dancing across your image sensor. Simply leaning against a wall will give you a lot of extra stability. You can either shoot parallel to the wall or you can twist your torso away and shoot perpendicular to the wall's surface. Just like in the "Torso-Twist-Hip-Point" position described on page 71, I find facing away from a wall more stable if the situation gives me the choice.

As you can see, in both cases I maintain a light shrug. Nothing too dramatic, but enough to help tighten my posture. Also, as with every other position I have talked about so far (except for sitting), my elbows are tucked in tight together against my chest.

## Elbow Hook

If there is a vertical column, fence post or simply the end of a wall in the vicinity (or a door frame like the one in fig. 12), you can hook your elbow on the edge of it. In this case, I am shooting through a doorway while stabilizing my entire body with my elbow. Like many of these positions, an elbow hook is by no means perfect, but it still helps if it is the only solution available.

In case you didn't notice (it's OK, I didn't notice either until I reviewed fig. 12 at the editing stage), my body is not leaning on the wall. You can lean on the wall if you want, but if you do, bear in mind that you will be reaching even further along it with your elbow. Another alternative in similar situations is to lodge a corner of the wall, fence post or whatever in your armpit



**Fig. 12:** Shooting through a doorway. My elbow stabilizes my entire body. This solution is far from perfect, but still helps if it is the only one available.

and squeeze, making a kind of impromptu vice.

## Monopod and Bipod

Another popular and very effective means of stabilizing is to use your elbow as a monopod. You can plant it firmly on virtually any



**Fig. 11:** Simply leaning against a wall gives you a lot of extra stability. You can either shoot parallel to the wall's surface (left) or you can twist your torso and shoot perpendicular to it (right).



horizontal, flat, rounded, or even pointed surface, whether this be the top of a fence post, the back of a chair, a ledge, a window sill, a railing, or anything else really. Using an arm as a monopod support has helped shooters to stabilize for centuries.

Alternatively, use both elbows as a 'bipod'. This technique is especially effective if you are in a sitting position. As previously mentioned, leaning into a position maximizes stability (fig. 14). Notice the increased spread of my elbows in the leaning variation. If possible, I try to completely flatten my elbows, as shown in fig. 15. I have had a lot of success using this position.

If you flatten your elbows, you won't, of course, be able to maintain the wrist position that allows your palm to support the bottom of the lens barrel, so you will simply have to experiment to find out which variation is most comfortable and stable for you – elbows flattened or the 'leaning-forward-but-still-upright' position.

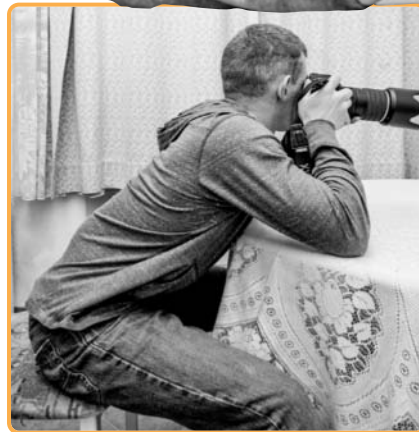
At this point, you might be asking yourself why I don't just place my camera on the surface if I am so close to it anyway and use the self-timer to release the shutter. This is, of course, a viable alternative, but doesn't work if the surface you are working with is too thin to support your camera. In such cases, you can still use it to create a brace and capture that long exposure handheld.

## Shooting Through Windows

This an unconventional but really effective brace that is similar to the elbow hook



**Fig. 13:** Make a 'C' shape with your thumb and index finger. With the camera firmly planted alongside the ladder, use the 'C' to pull the lens toward the ladder, as if you were fastening them together.



**Fig. 14:** An arm used as a monopod has helped stabilize shooters for centuries. As always, leaning into a position maximizes stability.



**Fig. 15:** If possible, I like to spread my elbows to form a super-stable 'bipod'

mentioned above. If you have a ledge – for example an open window, a high table, or a bookshelf, you can use it to great advantage. In fig. 16 I am using just such a 'window' (in reality the ladder of a bunk bed) to brace myself.

Here, my elbow is sagging down because I am squeezing the ladder rung into my armpit to further stabilize my stance. If you have access to a very wide ledge, laying your elbow flat on the ledge surface is a great solution too.



**Fig. 16:** If there is an open window, a high table, or a bookshelf handy, you can use it to create an effective brace. In this illustration, I am using the ladder of a bunk bed as a makeshift 'window'.



# Breathing Control, Aiming and Shutter Squeeze

Did you know that there is a natural pause in your breathing pattern that occurs every time you inhale and exhale? This break defines your shooting interval.

## Breathing Control

Consider the trajectory of a thrown baseball, an arrow shot into the air or an (unguided) artillery round. What happens? As long as the start and finish points of that trajectory have the same elevation, the path the projectile follows will always be perfectly symmetrical.

At the top of the flight path, the acceleration switches from positive (going up) to negative (coming down). It is at this point that the projectile completely stops all movement and is 'suspended' in the air, immobile for a fraction of a second before gravity causes it to head back down to Earth.

Exactly the same thing happens at each peak of your breathing cycle. Whether you are at your most calm during a peaceful night's sleep or at mile 21 of your first full marathon, your breathing is rhythmic, and the natural pause in the respiratory cycle is most pronounced at the very end of the exhalation phase.

To put breath control into practice, begin breathing slowly and in a controlled fashion. The moment you have completely exhaled, hold your breath – half a second later is when you should aim to fire your camera's shutter (fig. 17).

Most people find this to be the most natural breathing rhythm, but there are nevertheless two other major variations on the method described. The first of these involves an exhale-hold-exhale pattern. In other words, you hold your breath mid-exhale, take the shot and then continue exhaling. The other method is the exact opposite of the primary method described above and follows an inhale-hold-exhale pattern.

A few people prefer to hold their breath right in the middle of the cycle. I don't get on with this method at all, but nothing should hold you back if you are one of the select few individuals who prefer this approach. Still others prefer to hold their breath with their lungs full of air, as this gives them a sense of 'fullness' that contributes to their feeling of stability. I shoot my rifle in a standing position using the exhale-hold-inhale method, but I switch to the inhale-hold-exhale method when I am prone (i.e., lying on my stomach), as I feel better stabilized with my stomach and chest fully expanded. Try them all – it won't take long to found out which breathing method works best for you.

## Aiming and Sight Picture

Sticking to shooting terminology, it is important to get the same 'sight picture' every time you raise your camera to your face to take a photo. Try to find a place on your camera that your nose can instinctively find before every shot. I squeeze my right nostril shut on the left edge of my camera with the top of the viewfinder cup bisecting my right eyebrow and pressed firmly against my eye socket. Every time. Once you have found your ideal position, you can then concentrate on focusing and framing your shot as necessary.

## Shutter Squeeze

Last but certainly not least is the final catalyst to taking the photograph itself. When you 'pull the trigger' (i.e., release the shutter), you move the entire camera and cause it to come off target in spite of the fact that you are aiming right at it. Your shutter squeeze technique has to be just as calm and controlled as your breathing. Squeeze it slow. When shooting handheld long exposures, it can take me as long as two whole seconds to push down and activate the shutter button.

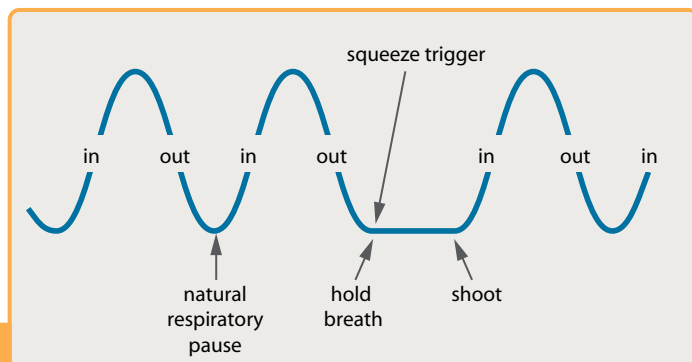


Fig. 17: Hold your breath at the end of the exhalation phase of the respiratory cycle – half a second later is the perfect moment when you should aim to fire your camera's shutter

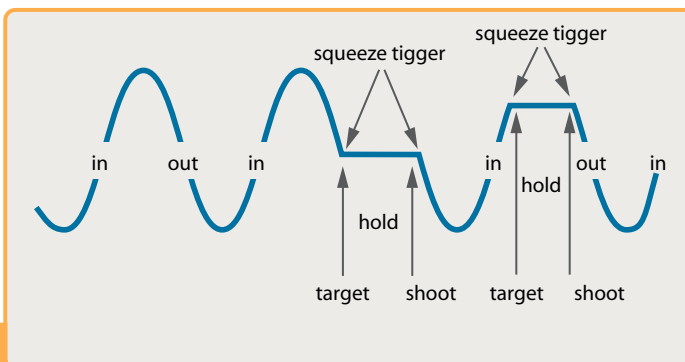


Fig. 18: Two other breathing control variations. The first involves holding your breath in mid-exhale, taking the shot and then continuing to exhale, while the other is based on holding your breath at the end of the inhale phase of the cycle.

You can also use a two-second self-timer delay in handheld situations, although be warned: the self-timer deactivates shake reduction, and I have yet to find a way to disable the deactivation. Start the timer toward the end of your exhale cycle so that the camera automatically fires just when you begin to hold your breath. Don't be discouraged if this technique doesn't work right away – getting the timing right takes practice.

Also, 'follow through' is almost completely neglected in photographic situations. Golfers know all about finishing their swing and concentrating on the position of their hip and back foot after contact with the ball has been made. Basketball players point their shooting hand down following the release of the ball to 'close the lid'. The same concept applies to photography and can be performed in two ways.

**Squeeze Through:** In single shot mode, hold the shutter button down the whole time

the shutter is open and until you hear the mirror swing back down, then count one full second before releasing it. This is the point at which you should once again begin to inhale. See how everything comes together?

**Continuous Drive:** In continuous drive mode (I recommend a low speed setting if you have the option), use the first exposure to get the shake out, the second for the keeper picture and the third to release the shutter button and inhale again.

## Conclusion

As you can see, this particular puzzle consists of many small pieces and you will have to make a considerable effort to put them together and see a significant change in your photography. You may have the best breathing pattern in the world, but if you can't 'pull the trigger' on your camera in a controlled, deliberate manner you won't reap any benefit.

It takes a lot of practice and repetition (repetition, repetition) to turn these fundamental skills into second nature, just like learning to ride a bicycle, drive a car or play a musical instrument. The first time you attempt to do any of these things, you concentrate on every aspect of the task at once – How do I avoid falling? Which note is that? Those trucks didn't seem that big when I wasn't behind the wheel. But one day, after you had practiced them enough (dare I say through repetition, repetition, repetition?) they became instinctive.

Applied to sports, the scientifically accepted term for this phenomenon is 'muscle memory' – your body has performed a certain motion so many times that you don't have to think about it and doing it seems entirely natural. This is why a trained gymnast can make six handsprings in a row look effortless, while my attempts at just one (with spotters on both sides to catch me) resembles what my sergeants affectionately refer to as a "soup sandwich".

Although the methods outlined here are what the United States military has labeled the "Four Fundamentals of Marksmanship" in their technical and training manuals, the nuances involved and the amount and type of training involved in making them instinctive will vary widely from person to person. There are many different ways to combine these techniques, so experimentation is the best way to determine which approach yields the most effective and consistent results.

When learning these principles, focus on one at a time. Start with body positioning and, once you have those components down, go on to enhancing your breathing technique and so on. Or start with sight alignment, as it is the least complex section. However you approach your training, start with just one aspect and build on it using the previously honed component as the foundation for the next. Remember: slow means smooth, and smooth makes you fast. You don't start street racing as

soon as you get behind the wheel, and you will stall hundreds of times until you don't have to think about that d\*\*\* clutch any more!

A closing disclaimer – the techniques described here are by no means exhaustive, and there other positions and techniques that you can experiment with. I have attempted to describe how my marksmanship training has helped me to improve and enhance my own photographic capabilities. I hope my explanations help you too. (jr)

### About the Author

Deployed to Afghanistan as a commissioned officer in the United States Army with a focus on engineering and linguistics, Alexander Jansen is a First Lieutenant currently involved in training Afghan National Army soldiers to clear roads of hidden or buried bombs known as Improvised Explosive Devices (IEDs). His family lives in Florida and he is currently stationed in Bavaria, Germany. He enjoys travel, rock-climbing, running, obstacle courses and the study of languages.



### About the Illustrations

All photos were taken with a Pentax K-5 and DA 12-24mm f/4, DA 18-55mm f/3.5-5.6 WR and DA 55-300mm f/4-5.8 lenses. I also used a Manfrotto 7301YB-BB Tripod and a 12-second timer with no remote. Flash was a Metz 50 AF-1 in P-TTL mode. Processing, cropping and conversion to black and

white were all performed using Adobe Lightroom 3. Research for this article was conducted using various marksmanship manuals. After a painfully arduous casting process, the author himself was selected to model the described positions.

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Ralph Altmann, Alexander Altmann

# How to Combat Camera Shake

If you don't have access to a tripod while you're out and about, you need either a steady hand or additional gear to help you keep your camera (or its sensor) still while you shoot. This article introduces some useful accessories and shows you how to use them to prevent camera shake under everyday and extreme shooting conditions. We also used our own four-wheel-drive motorized lab to test the limits of commercial image stabilizing systems.



Pro photographers are often recognizable by the heavy tripods they carry. The stiller the camera, the sharper the resulting images will be, as anyone who earns money taking photos knows. However, a tripod isn't always the ideal solution. In fact, if you are shooting from a jeep in an off-road situation or from a ship or a helicopter, a tripod will actually do more harm than good, as it will transmit any mechanical vibrations directly to the camera. In situations like this, it is often easier to keep the camera still if you hold it yourself, especially if conditions allow you to use exposure times of 1/50s or less. Modern image stabilizer systems help to prevent camera movements from affecting the sensor or the image it produces, but there are still 'natural' limits to what you can achieve without mechanical aid, even if you take our tutorial on page 68 to heart and improve your handheld technique accordingly. The following pages will help you to identify the limits of your technique and equipment and show you how to use additional gear to help you move beyond the usual limitations. We also take a look at how these techniques can help video-makers to avoid capturing shaky footage.

## Sources of Camera Shake

Try standing still for a minute and you will discover that even the apparently simple task of remaining balanced is actually a dynamic process that involves constant readjustment of a large number of muscles. Your body is constantly making slight compensatory movements and, as a result, a handheld camera does the same. The frequency of the movements picked up by a camera is slightly higher than that of the body's own 'tremor', which varies from person to person and can be controlled (but not completely eliminated) using advanced body and breathing control techniques (once again, see page 68). This means that, in principle, it is physically impossible to hold a camera absolutely still using just your body as a support.

**This quad bike served as our mobile anti-shake testbed. The photo of a stork was one of the in-focus flukes that we captured along with our other material.**

These low-frequency muscle movements are one of the most common causes of camera shake. Another is the way we often unintentionally 'pull' the camera during the exposure. This occurs because reflex cameras block the photographer's view of the subject during the exposure, either by raising the mirror or temporarily switching off live view. In the case of long exposures (one second and more), an image stabilizer can help you compensate for muscle tremor but cannot stop moving the camera inadvertently.

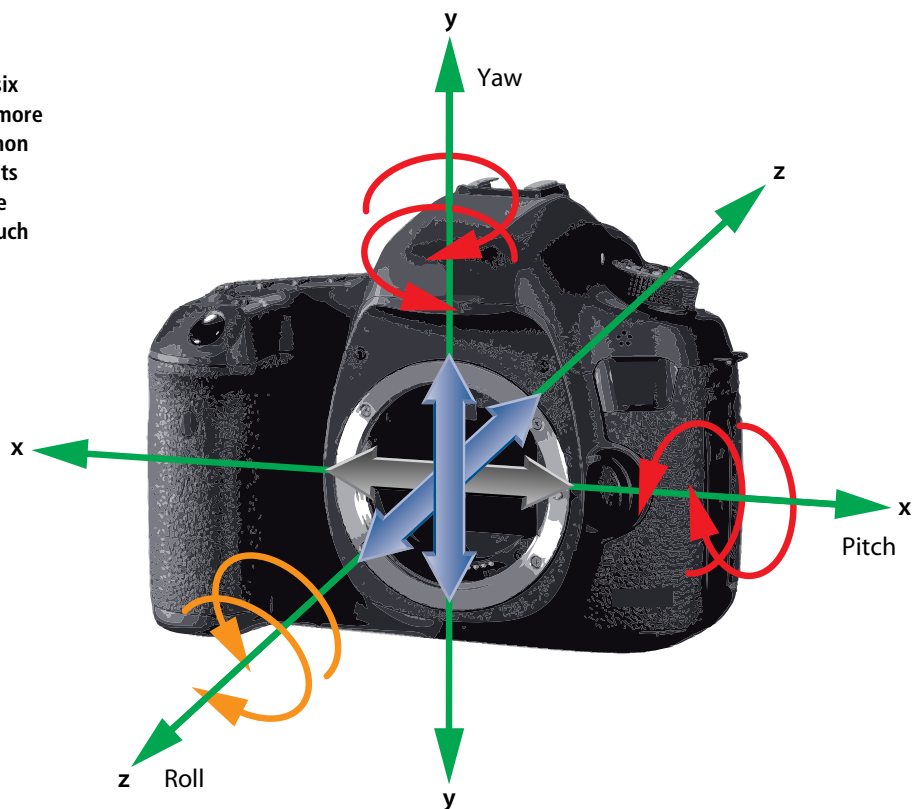
In situations in which you are tracking fast-moving subjects (such as sports events or race cars), image stabilizing systems have to compensate for vertical camera movements only. One example of this type of system is Nikon VR, which can supposedly tell the difference between deliberate pans and camera shake automatically.

Things get more complicated when your location is moving too. It is particularly difficult to compensate for random, long-wave vibrations such as those produced by a moving vehicle, because they are not consistent enough to enable you to establish a counterpattern. Such conditions are too much for almost any image stabilizer system and the resulting unavoidable camera movements are every video-maker's nightmare.

Single sub-optimum frames are not a film-maker's greatest concern, as most video is shot using shutter speeds of less than 1/50s anyway, and a single shaky frame not usually visible among all the others in a clip. Nevertheless, as video cameras become smaller and lighter, handheld shots – especially for sequences shot while walking or running – will be increasingly



A handheld camera can move in one of six different ways. Rotation around one or more of the three main axes is the most common cause of camera shake. Linear movements along the x, y or z axes only affect image sharpness at large reproduction ratios such as those used in macro photography.



prone to shake. We decided to see whether the complex technical aids that film-makers often to eliminate such effects can be of use to photographers in the daily battle against camera shake too.

Subject movements don't generally count as a source of camera shake, although they

always have the same effect on the results. No-one has invented an image stabilizing system that can compensate for subject movement yet, and the only way to counteract it is to use a fast shutter speed or, if your subject is following a predictable path, pan the camera during your shot.

### What if a Tripod doesn't Help?

The camera itself can also be the source of unwanted movements. The movement of the shutter opening and closing can cause the camera to vibrate and the raising and lowering of the reflex mirror can even ruin

## The Nuts and Bolts of Camera Shake

Tests have shown that anyone who uses a camera handheld produces camera shake at a frequency of between 8 and 12 Hertz and an average amplitude of 0.5 degrees. At a subject distance of 10 m, this equates to an average of 5 cm of camera movement. The degree to which this movement affects the quality of the resulting images depends on the focal length of your lens, the resolution of your sensor and the size of the displayed image. A 50mm full-frame lens has a horizontal angle of view of 40 degrees. In a camera with a 16-megapixel sensor, this is distributed across about 5,000 pixels, which means that 0.5 degrees of movement leaves traces on the sensor over a distance of 60 pixels – enough to make a photo unusable.

To produce sharp photos, traces of camera shake should be no longer than the diameter of the circles of confusion that are tolerable for the aperture setting you are using. This measures 17.8µm for an APS-C camera and an image enlarged to 12x8 inches, and is equivalent to 3.5 pixels of a 16-megapixel sensor. (See [www.dofmaster.com](http://www.dofmaster.com) for help calculating these values.) Such a value helps you calculate the maximum number of degrees you can afford to let your camera move if you want sharp results. For a 50mm full-frame lens, it is less than 0.03 degrees. What this all boils down to is that to be effective, an image stabilizing system has to reduce 'normal' body

tremor by a factor of 20 for a 50mm lens, and even more for a telephoto.

You can calculate the maximum effective shake compensation for sensor-based stabilizers like those used by Sony, Pentax and Olympus. For example, Pentax sensors move by a maximum of 4 mm, which equates to a horizontal sixth and a vertical quarter of the 23.6 x 15.7mm sensor and its available angle of view. This means that the maximum angle of view that the stabilizer can effectively work with (for an assumed shake of 0.5 degrees) is 3 degrees horizontally. This equates to a highly usable maximum effective focal length of 600 mm.



shots taken using a tripod if the exposure time lies in the critical range above 1/10s. We find that image stabilizers are of little help in such situations. Many camera manufacturers and photo guides advise you to switch stabilizers off if you are using a tripod. Our tests proved that this is sound advice for the sensor-stabilized Sony Alpha 580 – in fact, using the stabilizer system made the results a lot worse.

Mirror lock-up is an effective way to counteract camera shake caused by mirror movements, but not all DSLRs have this functionality built in. Weighing down your camera and/or tripod can also help to cancel out mirror-based shake. Extra weights combat shake caused by wind quite effectively, and adding a remote release helps to prevent shake caused by pressing and releasing the shutter button.

## Short and Sharp

The simplest and most effective way to combat camera shake is to use a short exposure time. An old photographers' rule of thumb states that the shortest effective shutter speed should be at least 1/focal length if you want to be sure of getting sharp results. This ballpark figure is independent of the size of your sensor if you calculate it for full-frame equivalent, rather than absolute focal lengths. Such an approach is, of course, approximate, and will vary depending on your shooting ability and the size at which you display the final image.

Modern image stabilizers have made a big impact on shooting techniques, and manufacturers claim that you can shoot with a 400mm lens using exposure times as long as

## How We Tested

Many tests have shown that, when used under 'normal' conditions, the image stabilizing systems offered by the major camera and lens manufacturers enable photographers to extend their usable range of shooting parameters by several f-stops. We decided to test whether these systems are just as effective under extreme conditions, such as those created by shooting from a moving quad bike on bumpy ground. We tested Nikon, Canon and Sony cameras and lenses with and without activated stabilizers, using a pattern of different sized dots as our target to enable the cameras to focus as easily as possible. We shot handheld using a 70mm (105mm full-frame equivalent) lens and exposure times between 1/250 and 1/15 s. Conventional wisdom suggests that 1/100s should be the limit for producing sharp results from solid ground without an image stabilizer. We repeated our test for all available stabilizing modes. To finish up, we also

tested whether using a gyro stabilizer (in this case a Kenyon KS-8), again shooting with and without active image stabilization, would affect the results.

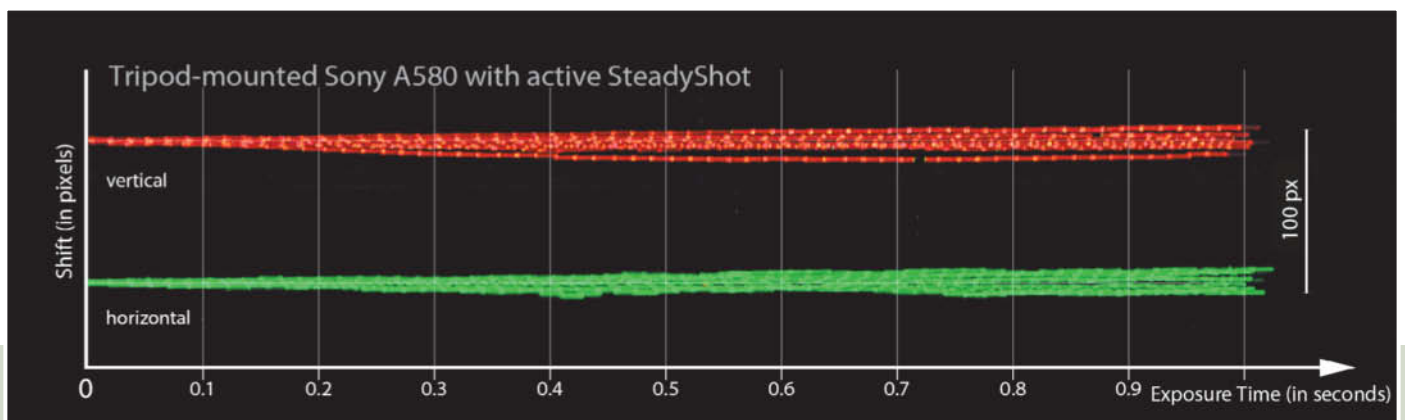
We also performed a test to compare the results of using accessory stabilizers with those produced by the KS-8 and our test cameras' built-in stabilizers for exposure times of up to one second. To do this, we photographed points of light moving across a black monitor screen at preset speeds. The results of this test are printed on the following pages in the form of separate distance/time graphs recorded for vertical and horizontal camera movements.

In addition, we tested the comparative effectiveness of the Kenyon KS-8 and a Skyler Minicam Mark II steadycam using video footage shot during a fast run across a bumpy forest floor. The results are included on this issue's free DVD.

1/25s if you activate image stabilization. This equates to four f-stops of additional shooting leeway compared with generally accepted values. On the surface, such numbers would appear to fulfill telephoto users' wildest dreams, but be warned: manufacturers' figures are always accompanied by a "... can be as much as ..." caveat. You also have to consider the actual amount of available light

in your particular situation, and some situations – such as shooting from a moving jeep – are simply too much for any image stabilizer. If this is the case, the best thing to do is to look for other ways to reduce your exposure time.

**Use a larger aperture:** Obvious but effective, this method also reduces overall depth of field, thereby offering potential



This distance/time graph, plotting the results of 10 separate test runs using a tripod-mounted Sony Alpha 580 with active SteadyShot, shows that the discrepancies caused by regular movements increase exponentially with time

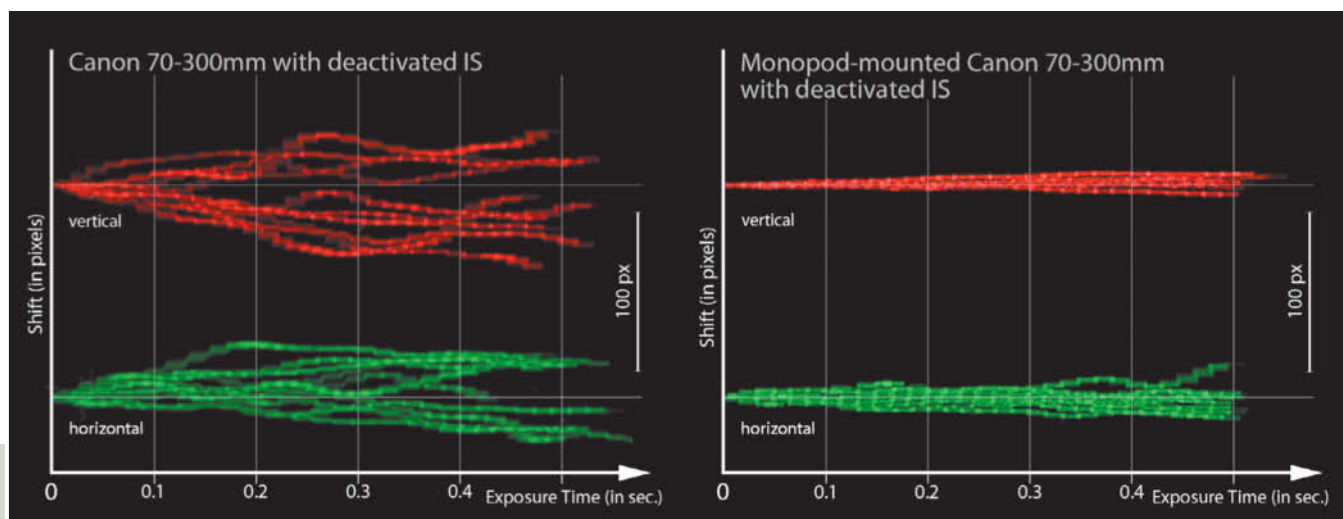


We set our test cameras to continuous shooting mode and shot while circling our target on a quad-bike

improvements to the composition. It is an option only if greater depth of field is not critical to the shot itself. You also have to focus more precisely and your lens has to have aperture reserves for you to use in the first place – the ‘four stops’ of headroom that manufacturers claim to provide don’t help if you are already shooting at f11 and your telephoto zoom has a maximum aperture of f5.6.

**Increase ISO sensitivity:** Also a trivial idea, but nevertheless one that many manufacturers market as a kind of ‘electronic stabilizer’ – a ploy that is actually just fraudulent labeling. Film with differing sensitivity has existed since the earliest days of photography and, then as now, increasing sensitivity increases the incidence of image artifacts, whether in the form of analog grain or digital noise. Nevertheless, a slight increase in noise is often preferable to a blurred image. Additionally, improvements in sensor technology are constantly increasing the sensitivity levels at which we can shoot adequate photos, and ISO 800 is nowadays a realistic setting for use with a mid-range APS-C camera. But remember, if you want to increase your exposure value by four stops, you have to increase ISO sensitivity from 100 to 1600.

**Increase the amount of available light:** This is simultaneously the best and most difficult way to reduce exposure times, and does not reduce depth of field or increase noise levels. In this case, an increase of four stops is equivalent to replacing a 60-watt bulb



How good is a monopod? Our tests showed that, when used with a Canon 70-300mm lens, a monopod is second only to a conventional tripod when it comes to effective image stabilization. In fact, it was almost as good as the active in-lens stabilizer at damping quick movements.



The authors have been using the Cullmann Cruiser shoulder pod/tabletop tripod (US\$69.95) for years. It is easy to fix it to street lamps, fences etc. using a bicycle luggage carrier strap.



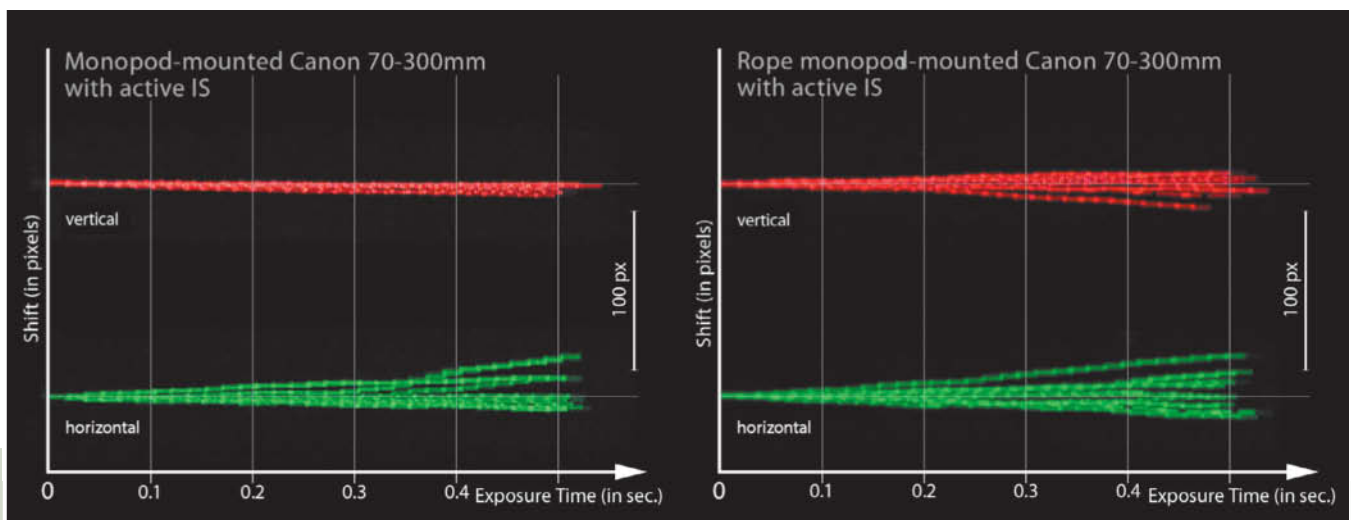
### Accessory Stabilizers

The next-best way to tackle camera shake is using a tripod. If you find a conventional tripod too clumsy for everyday use, a monopod is a great, lightweight alternative. A monopod completely prevents vertical camera movements and, because it relocates the center of rotation of the camera to its own foot, it automatically limits pitch and roll movements. Monopods usually have a

with a 500-watt halogen floodlight (or 1000 watts worth of conventional light bulbs). Reducing the distance between the light source and the subject also increases brightness – halving the distance provides two extra stops of exposure.

**Use flash:** This reduces the exposure time to the duration of the flash, even if the shutter is actually open for longer. Typical flash durations are around 1/4000s, making shake and unwanted subject movement practically impossible. Studio and fashion photographers

often use independently controllable flash heads, and all photos that include wildly waving hair or perfectly focused water droplets are shot using this type of equipment. Pop-up and hot-shoe-mounted accessory flash (rightly) has a reputation for producing flat-looking images, although it can be useful for providing extra sharpness and light if used sparingly as fill flash. Accessory flash is also great for producing mixed sharp/unsharp effects if used with longer exposure times.



Left: activating the image stabilizer slightly improves the monopod’s performance  
 Right: the same test shows that a rope monopod isn’t quite as effective as a conventional monopod

pointed foot, making it simple to perform pans too. This is one of the reasons panorama photographers often use a monopod in preference to a tripod to capture 'blind' overhead shots for use in 360-degree panoramas. If your monopod doesn't already have one, a spirit level taped to the main tube will help you to keep things level while you shoot. It is always advisable to use a remote release when using a monopod. Some monopod manufacturers also include a broad rubberized foot to provide additional friction – Gitzo and Manfrotto (and probably others too) sell rubber feet separately, so it's worth trying one out to see if it fits your model.

An alternative to a conventional monopod is a 'rope monopod', built from a tripod screw, a rope and a metal or plastic plate for you to stand on. The idea is to set up a length of rope under tension between your foot and your camera, and the result is a surprisingly

effective way to prevent unwanted camera movements. If you attach the rope to the nodal point of your lens instead of the camera's tripod mount, you can use it to help you produce shake-free, multi-row panoramas without parallax errors. Commercial rope or wire monopods (such as the 'Steadepod') usually have a spring-loaded roll which you can lock at any length.

If you are using a monopod, the ground you stand on has to be just as stable as it does if you are using a tripod. If you are on unstable ground or if you want to shoot video handheld, you are better off using a camera support that attaches to your own body, such as a steadycam. This type of support is less prone to wobble than the operator's hand, especially when a large, heavy camera is attached to it! A chestpod or shoulder pod also allows you to let go of your camera if you need to. Video enthusiasts often use chestpods, but they can be useful for

photographers too. The Cullmann Magic Chestpod (US\$80) is a good basic model.

These types of stabilizing aids don't allow you to make shake-free long exposures, but do extend your range of exposure times by significantly reducing the amplitude of your body's own shake. They also extend the capabilities of the stabilizing mechanisms built into your camera by reducing the amount of compensation they have to apply.

### Only Flying is More Fun

If you want to see a really effective vibration reduction system, take a look under your car. The system of wheels, springs and shock absorbers is extremely well suited to preventing the effects of uneven ground from being transmitted to the car's chassis. The most important element of the system is the relatively loose, spring-mounted connection between the wheels and the rest of the car,



The humming, bomb-like KS-8 gyro stabilizer from Kenyon weighs 2.3 kg (5 lb) and is mounted beneath the camera. The device works on the same principle as a gyroscope and is slightly clumsy to use, although still not as unwieldy as a steadycam. The battery pack has to be carried separately.



## Don't Jog My Gyro

It would make life much easier for camera operators if it were physically possible to increase the inertia produced by the camera without increasing its mass. Another way of producing damping effects is to use the gyroscope principle. This uses the physical fact that a rapidly rotating mass retains its current axis of rotation unless acted upon by a strong external force. Everyone knows that a toy gyroscope or a moving bicycle stabilizes itself if left to its own devices. Gyroscopic stabilizers were first used in navigational instruments and for military applications. We tested a gyro stabilizer made by Kenyon – a model that is believed to have been developed for use by snipers during the Vietnam war. We prefer its current adaptation, which, when attached to the underside of a camera, significantly increases its apparent mass, especially during pans performed perpendicular to the gyro's axis of rotation. If, however, you move the camera sideways or roll it around the gyro's axis, you only feel its own additional weight, which ranges from

which allows the wheels to move freely over obstructions while the chassis 'floats' above them. The lighter the wheels and the heavier the chassis, the more effective the system is. The shock absorbers ensure that the system's inherent oscillations don't get out of control.

The same principle is used in the Steadicam, invented by movie cameraman Garrett Brown in the 1970s. (By the way, the word 'Steadicam' spelled with an 'i' is a registered trade mark.) The steadycam principle involves attaching the camera to a vertical tube, which is then attached to a counterweighted gimbal that allows the operator to move the camera in any direction laterally while retaining the same horizontal position and direction of view. The gimbal mount and additional springs ensure that any unwanted rotations, shocks and vibrations have only minimal (or no) effect on the camera's position. The sprung arm in heavier steadycams is attached to a belt or vest worn by the operator, while the camera mount itself provides the required damping in lighter models. In other words, the torque produced by the steadycam's own weight prevents the camera from making sudden or unwanted rotational movements. The more weight the steadycam carries on either side of its gimbal, the more torque it produces and the harder it is to knock the camera out of position.

The invention of the Steadicam ushered in a new era of movie aesthetics and made it possible to perform pans and other camera movements from positions that were unthinkable using conventional cranes, dollies and tracks. Until recently Steadicam technology was too heavy and expensive for amateur use, but some companies are now producing smaller, less costly steadycams that are well suited to use with everyday video cameras and DSLRs.

We were given a Skyler MiniCam (about US\$600) to test. This model is suitable for cameras that weigh up to 2.5 kg (5 1/2 lb). The MiniCam can be tricky to set up, and the camera's center of gravity has to be positioned precisely above the central support. You also have to make sure that the camera and counterweights are adjusted so that the MiniCam returns to an upright position within three seconds if you tip it while holding it by its angled grip. It has fine adjustment screws and engraved scales to help you reconstruct a previous configuration, and its design means you can also use it as an impromptu tabletop tripod. The device comes with two large quick-release brackets, so you can leave one attached to your regular tripod and switch quickly between the two, although it is simpler and quicker to affix a quick-release bracket from your tripod's system to the MiniCam and attach your camera to that.

'Steadicam Operator' is a job in its own right, and learning to use one requires a fair amount of practice. Due to the weight of the device, it is virtually impossible to capture longer shots without using your free hand (placed near the gimbal) to help steady your equipment. Even though the MiniCam doesn't offer much space for doing this, it is important to avoid touching the camera itself during a shot. This means that you can't adjust focus or zoom settings by hand while using a steadycam, although pro models are equipped with remote-controlled motors to perform basic camera adjustments on the fly. Another reason for not adjusting camera settings during a shot is that doing so alters the position of the camera's center of gravity. Our tests showed that a simple change in focus can cause the MiniCam to tip at an unwanted angle and force you to readjust its settings. Steadicams are also quite sensitive to wind.

As you can see, a steadycam is not really the obvious choice for producing shake-free photos, although there is nothing to stop you from shooting stills if you are already using one to shoot video footage. Once you have found the right settings, the MiniCam's vibration damping system is very effective.

**Although it might look like a tabletop tripod, this is, in fact, the Skyler Minicam Mark II steadycam in action. The three-legged support makes a great ad hoc tripod, but the angled grip makes holding it for normal use quite tiring.**



800g to 8 kg, depending on the model. You also have to carry a battery and a current inverter, although these can be carried separately attached to your belt.

We were given a medium-sized KS-8 gyro to test for a few days. This 2.3 kg (5 lb) model is recommended for use with video cameras and DSLRs that weigh up to 5 kg (11 lb). The gyro requires a 115V, 400Hz alternating current (usually available in helicopters!) and takes up to 10 minutes to get up to working speed. The current is provided by a special inverter attached to the unit's 12V battery pack (which can also be powered from a car cigarette lighter socket). A fully charged battery powers the KS-8 for about two hours. The helium-filled interior of the device contains two gyroscope wheels that rotate in opposite directions at 22,000rpm and tilt by up to 75 degrees

perpendicular to the axis of rotation. Springs return the wheels to their original position and the design of the unit makes it easy to perform pans with smooth starts and stops.

A Kenyon gyro stabilizer works in two directions. If you mount it pointing in the same direction as the lens, it damps yaw and pitch movements, whereas if you mount it at right angles to the lens, it damps yaw and roll movements. If you want to prevent unwanted movements in all three axes, you have to use two gyros mounted at 90 degrees to each other. Cameraman Jost Vacano used a handheld Arriflex movie camera and two Kenyon stabilizers to shoot the interior scenes in the 1981 movie *The Boat*, which portrayed wartime scenes inside a submarine. This setup enabled him to capture stable footage while running and jumping through the sub's

hatches. Vacano's efforts won him an Oscar nomination and gave Kenyon stabilizers their breakthrough in the movie industry. Some camera operators combine Steadicams with one, two or even three gyros to provide ultra-stable shooting.

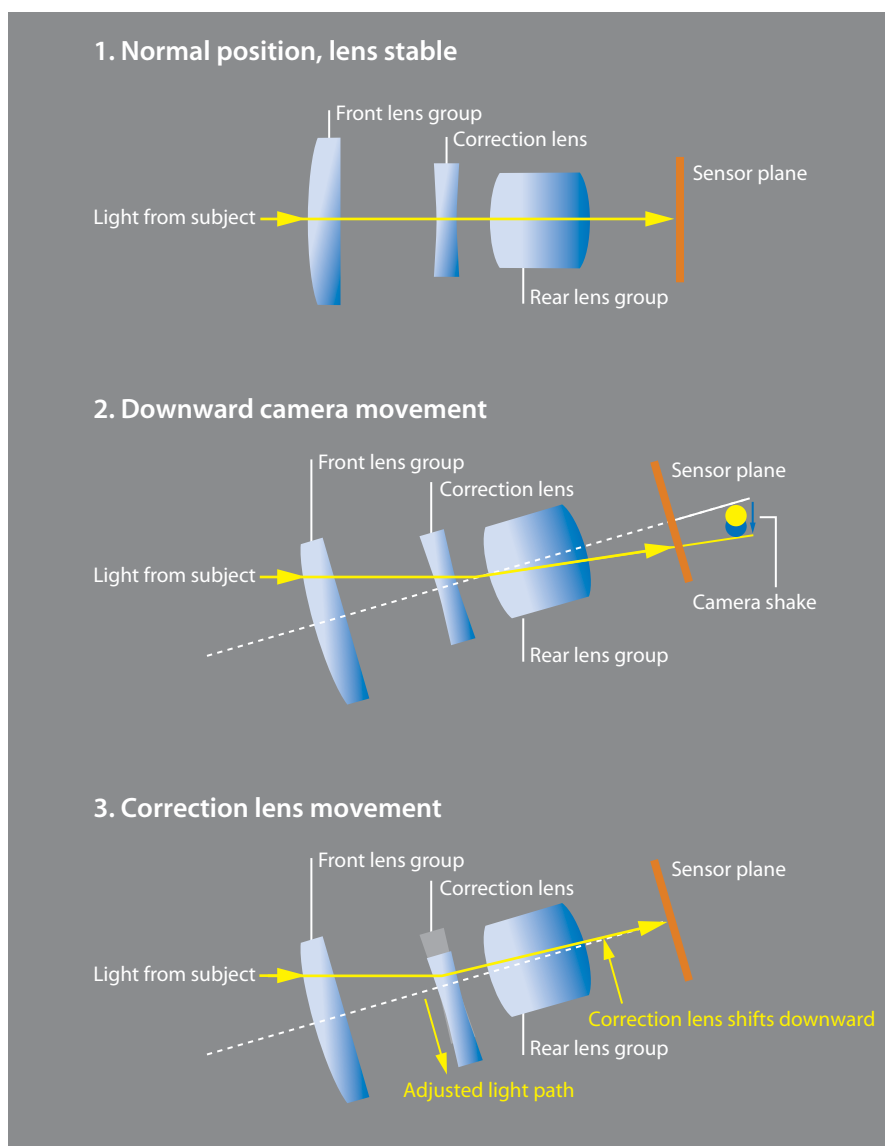
A gyro stabilizer is more compact, less susceptible to the influence of wind and easier to use than a steadycam. You can shoot normally with a gyro mounted and it effectively compensates for vibrations and minor shocks. However, both gyros and steadycams are themselves constantly in motion and are thus unsuitable for long exposure use. The trump card of such devices is their ability to allow you to continue shooting in situations where 'normal' exposure times (in the hundredths of seconds) are subject to camera shake. According to Dedo Weigert Film GmbH, who loaned us our test gyro, these types of devices are often bought or rented by aerial photographers.

The long warm-up time and the dependency on a special power source are the downside of the Kenyon approach. We also found that our test gyro got so hot that we could no longer hold it using our bare hands. Gyros are quite loud, so you have to use a separate microphone or dub sound later if you use one to shoot video.

Kenyon gyros cost between US\$1,300 for the KS-2 and US\$3,600 for the KS-8. Rental prices start at around US\$70 per day.

### Home-made Gyroscope

Most computers contain one or more 'gyroscopes' of their own in the form of hard disks that rotate at high speed. In a competition organized by our German sister magazine *c't*, one particularly innovative DIY expert took a disused hard disk and transformed it into a gyro stabilizer using similar construction principles to those used in Kenyon gyros.



**An optically stabilized lens contains an additional mobile correction lens that ensures that the light from the subject always hits the same sensor cells**

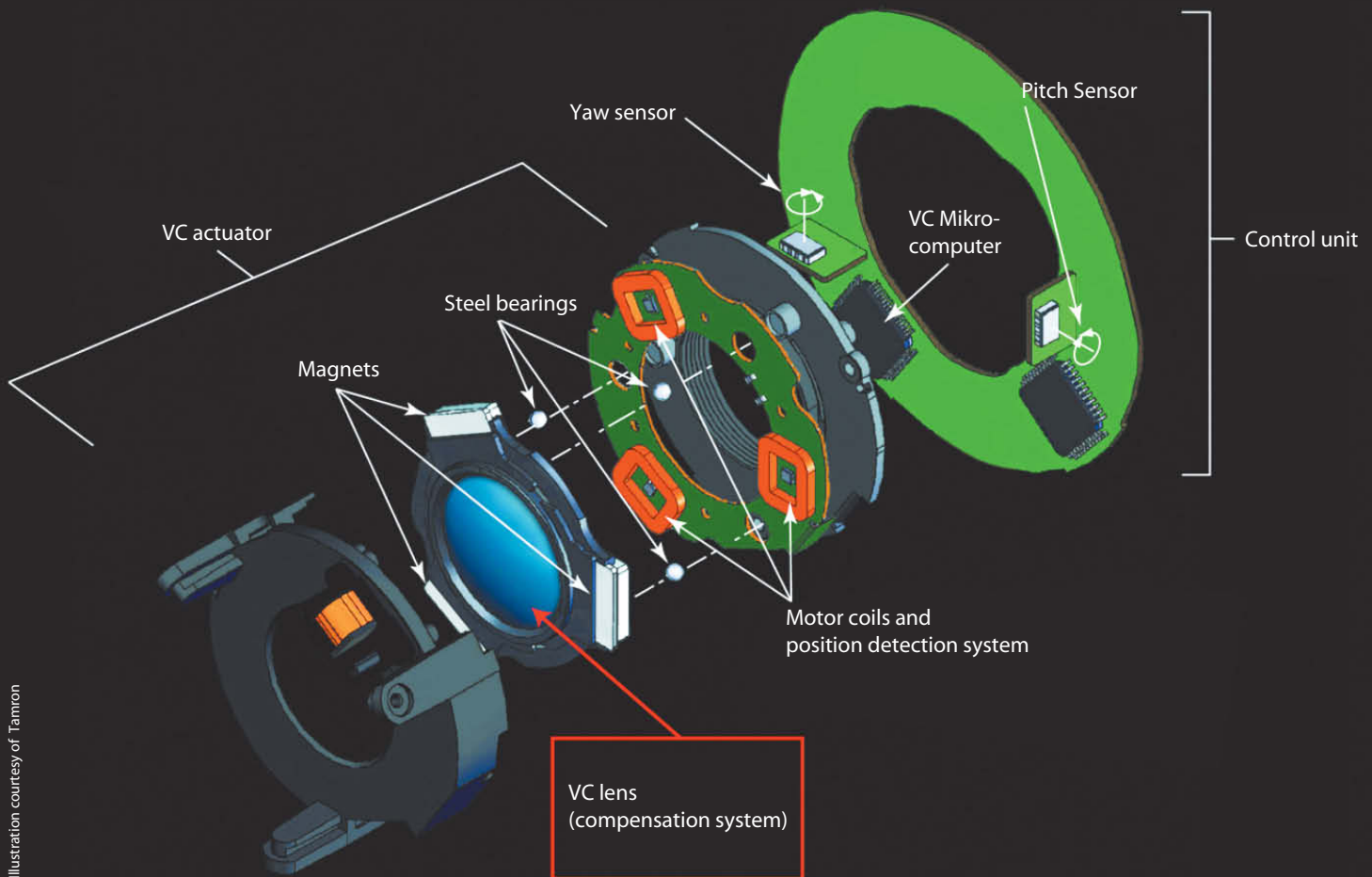


Illustration courtesy of Tamron

Diagram of the inner workings of a Tamron VC image stabilized lens

A hard disk cannot reach the same rotation speeds as a Kenyon, but is still capable of stabilizing a 1kg (2-pound) video camera when mounted on a cheap steadycam-style frame made of plywood. The device's constructor even managed to use it to shoot usable footage from a microcopter 'drone'.

### Active Stabilizers

The external image stabilizing systems we have described so far are all passive and often provide only moderate results in spite of being quite tricky to use. In contrast, many cameras now have a radically different, active solution to the same problem built in. In-camera stabilizer systems simply accept camera movements as given and only become active when they begin to have a detrimental effect on the image captured by the camera's sensor. These systems are based on the idea that the light rays emanating from the subject only have to be projected onto the same place on the sensor for the duration of the actual exposure. This can be achieved by shifting either the light path or the sensor to accommodate any camera movements that may occur. Canon, Nikon, Panasonic, Sigma

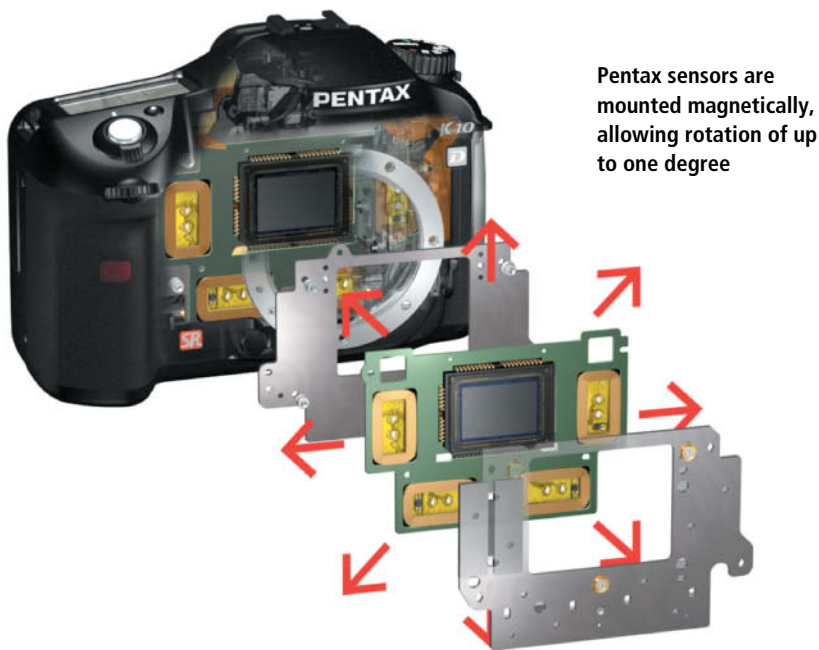
and Tamron all manufacture lenses that effectively 'bend' the light path within the lens, while Sony, Pentax, Olympus and Ricoh take the sensor-based approach and use tiny piezo-electric or electromagnetic motors to shift the sensor to the correct position. The shift data is delivered by microelectronic motion sensors that measure acceleration and angular velocity. These devices work to extremely high tolerances and have to produce extremely precise data at very short intervals in order to shift the sensor (or correction lens) simultaneously with the camera's movements.

This type of system usually comprises two sensors that measure angular velocity for lateral rotational and vertical pitch movements. Measuring linear camera movements requires the use of additional sensors, although error correction is performed in exactly the same way, as the difference between linear and rotational movements doesn't make any difference to the shift in the projected image (except in the case of ultra-wide-angle lenses). However, the only way to compensate for 'roll' movements around the optical axis of the lens is to produce a matching counter-rotation in the sensor. Shifts along the z-axis require an

additional degree of freedom within the stabilizer system to allow for changes in the plane of focus. This type of camera movement produces only negligible effects in standard and telephoto lenses, but produces significant effects in wide-angle and macro lenses. In fact, in order to produce truly stabilized wide-angle images, it is theoretically necessary to tilt the sensor plane to compensate for the altered perspective (such as converging lines) these lenses capture. As far as we know, no-one has yet created such a sophisticated system, probably because wide-angle shots are less prone to shake than those captured using telephoto lenses. Every photographer knows that the risk of camera shake increases with increasing focal length. Canon denied the necessity of this technology until it actually began to produce stabilized wide-angle lenses of its own.

### 'Bending' the Lens

Analog cameras were still the order of the day when Canon and Nikon introduced their first image stabilizers in the mid-1990s, so both companies had no alternative but to build their systems into the lens, as it would have been physically impossible to shift the entire



Pentax sensors are mounted magnetically, allowing rotation of up to one degree

shooting from moving vehicles. In 'Normal' mode, broader camera movements are interpreted as alterations to framing on the part of the photographer and are not corrected. The latest Canon and Nikon lenses automatically detect whether they are tripod-mounted, handheld or are being panned, and switch modes accordingly.

**Advantages:**

- The stabilizer can be precisely tuned to the lens in question
- A single correction lens can be shifted more quickly and easily than an entire sensor unit, making it easier to compensate for abrupt camera movements
- The degree of shift of the correction lens can be as large as technically possible and doesn't depend on the size of the image circle projected by the lens
- The viewfinder image is stabilized too
- Adapters, bellows and teleconverters mounted between the camera and the lens can be used without affecting the stabilizer system

**Disadvantages:**

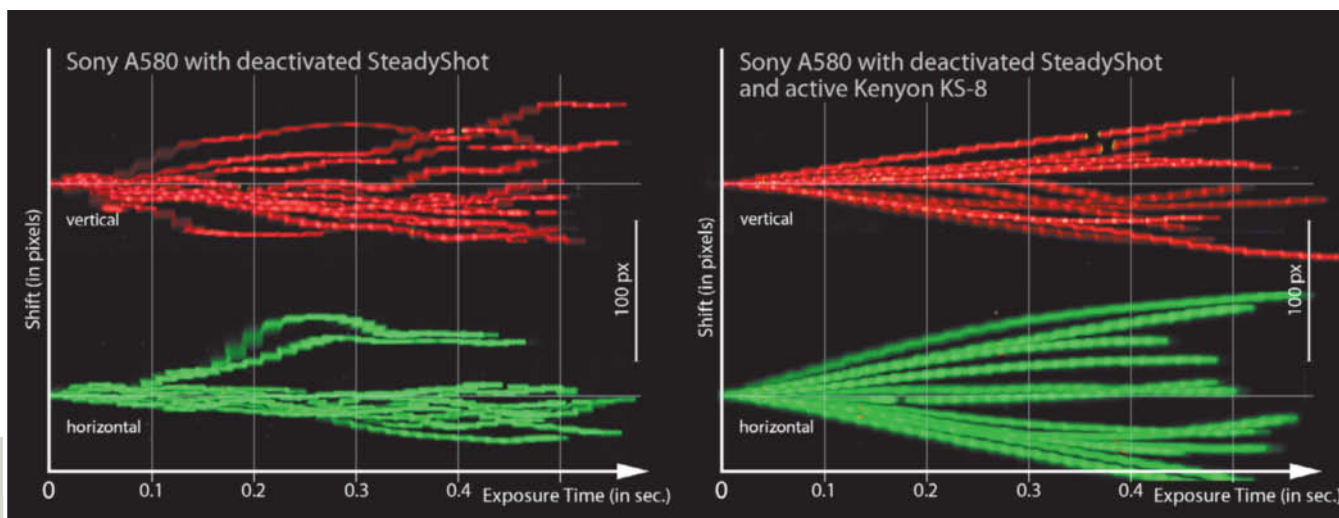
- Built-in IS systems make individual lenses heavier, more complex and more expensive. Canon's stabilized lenses are almost twice as expensive as their non-stabilized counterparts.
- Many popular lenses (especially those with fixed focal lengths) aren't available in stabilized versions
- Roll movements around the optical axis of the lens cannot be counteracted using conventional lens components, although

film and film transport mechanism. Thus the first stabilized lenses had not only a motor-driven correction lens but also a complete sensor system and accompanying electronics built in. The entire system was powered by the camera battery. Due to space limitations, these systems were initially only built into telephoto lenses, and it is only recently that further advances in miniaturization have made it possible to build similar technology into wide-angle lenses.

In addition to its conventional IS lenses, Canon has been producing Hybrid IS lenses

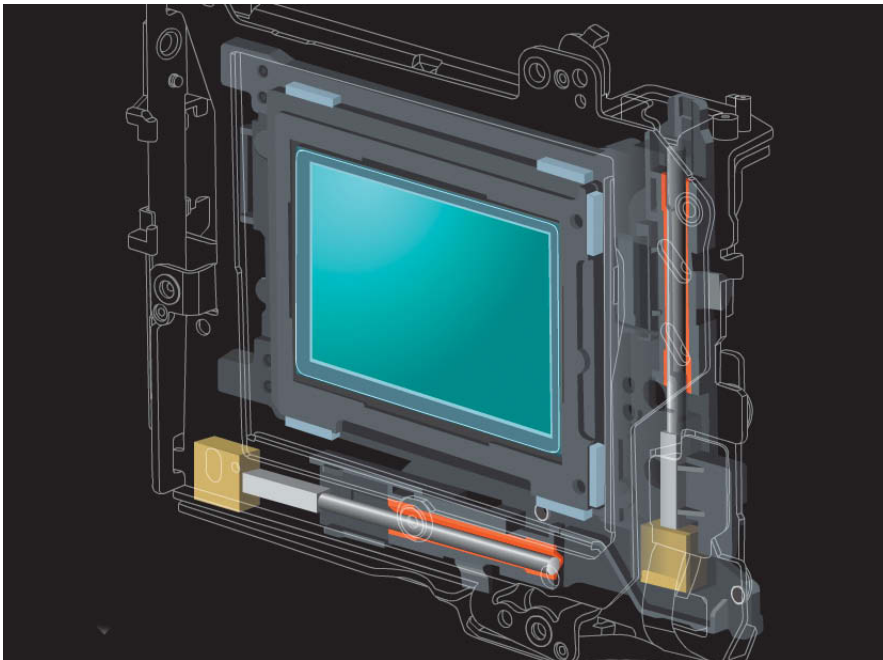
since 2009. These contain a third sensor that detects lateral and back/forward shift movements. This system is a boon in macro situations where even slight movements can spoil a shot. Hybrid IS has two modes that correct either vertical and horizontal movements or just vertical movements (for use with panned shots of moving subjects).

Nikon's VR (Vibration Reduction) system also has two modes. Nikon Recommends 'Active' mode (which compensates for vertical and horizontal camera movements) for



These two diagrams illustrate the effectiveness of the Kenyon KS-8 gyro stabilizer. The running gyro effectively counteracts short, sharp shocks, but the 'drift' effect it produces has a distinct adverse effect on longer exposures.





sensor along the x and y axes, and the accompanying sensors and electronics are built into the camera body. The obvious advantage of this approach is that it doesn't require special lenses, and all that is required for the system to function is for the lens to communicate its current focal length and focus settings to the camera.

Sony's Alpha cameras have two active sensors that detect both horizontal and vertical camera movements. The system is either switched on or off – there are no modes. The sensors built into current Olympus and Pentax models are mounted magnetically and are capable of rotating as well as shifting along the x and y axes. Pentax quotes a maximum shift value of 4 mm and maximum rotation of one degree, which enables the camera to compensate for roll movements around the optical axis of the lens. Olympus has introduced its own '5-axis' stabilization system with the OM-D range of cameras which, in addition to correcting pitch, roll and yaw movements, can also stabilize horizontal and vertical linear shifts in camera position.

**Advantages:**

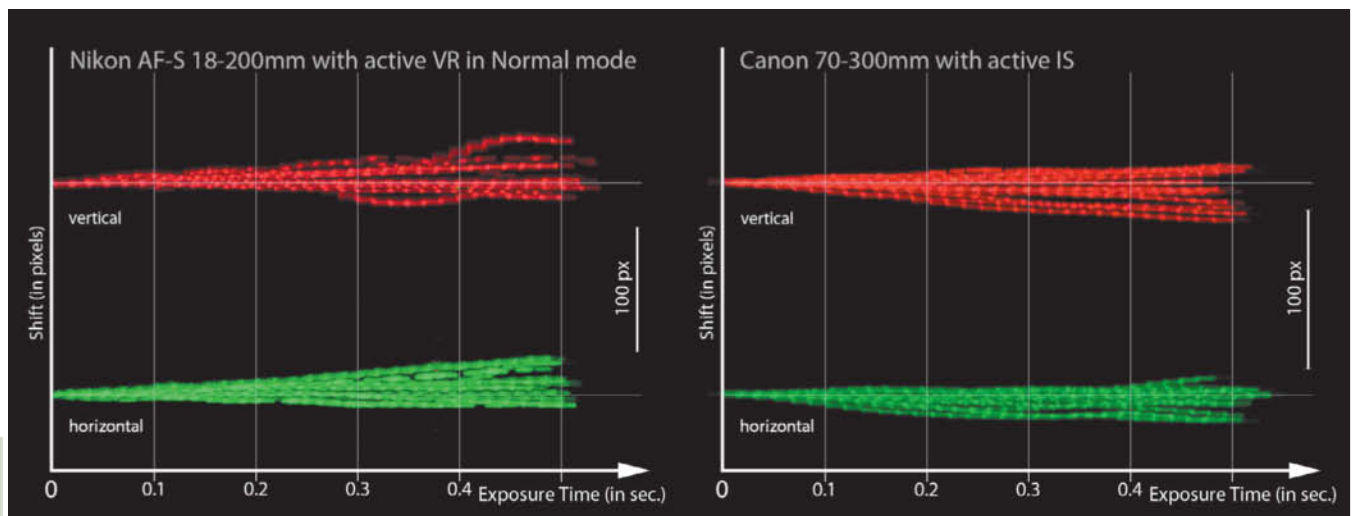
- The system is built into the camera body and only has to be paid for once
- No specially constructed lenses are necessary
- The system works with all lenses that have a compatible mount, regardless of their age. A lens only has to be capable of transmitting focal length and focus data to the camera, which most modern lenses can anyway. If

Sony's SteadyShot system uses two tiny piezo-electric motors to adjust the position of the sensor

Canon maintains that its Hybrid IS system can correct such errors to a certain degree by re-computing x/y shift data and shifting the lens accordingly. However, we suspect that this approach only corrects the linear component of the roll movement, especially if the axis of the movement axis isn't precisely commensurate with the optical axis of the lens.

**Sensor Shift**

In 2004, Konica-Minolta introduced the Dynax/Maxxum 7D, the world's first DSLR to use a sensor shift image stabilizer. Called 'Anti-Shake' back then, the system lives on under the SteadyShot banner following Sony's takeover of Konica-Minolta in 2006. It uses two tiny piezo-electric motors to shift the



A comparison of typical Canon and Nikon measurements. Both systems produce equally poor long-exposure stabilization.

## Stabilizing Video

Single shaky frames are not much of a problem when shooting video using shutter speeds of 1/50 s and less, and image stabilizers only make a difference if you are shooting at telephoto focal lengths. The real problem lies in the constant shifts in framing caused by the constant slight balancing movements of the camera operator's hand, which are especially prevalent with heavier cameras and can make the viewer feel 'seasick'. A conventional image stabilizer can effectively counteract such 'wobble' effects and can also help to make handheld shots look smoother. Stabilizers can help to smooth out pans as well, although they sometimes cause 'jumps' in a clip. As with

a stills camera, if you are shooting a video pan from a tripod, it is better to switch off your image stabilizer altogether. In a video context, a gyro stabilizer or a steadycam is preferable to in-camera (or in-lens) stabilization when you are shooting handheld pans or while moving. Built-in stabilizers also tend to produce noise close to the camera's microphone and reduce battery life. We have included a short video clip on this issue's DVD that illustrates the effects of gyro and steadycam stabilizers on video footage.

A recent trend has seen an increase in the number of aerial video clips shot from remote-controlled microcopters, or

'drones', with a camera slung beneath them. The camera is usually mounted on a motor-driven, sensor-controlled gimbal that keeps it level during flights. The principle is the same as the one used in camera-based image stabilizers, but instead of adjusting a single component of the camera, the system constantly adjusts the position of the entire camera.

There are many videos and how-to guides on the subject available online. Just search for terms like 'gyro stabilized drone', 'microcopter', or 'video drone'. There is basically nothing to stop you using similar mechanisms as a kind of 'active steadycam'.

the lens cannot transmit data, the camera uses a default focal length value equal to the sensor diagonal and assumes focus is set to infinity. These values undercompensate for telephoto lenses and overcompensate for wide-angles. Pentax cameras allow you to enter focal lengths from 8 to 800 mm manually via the menu system.

- A rotating sensor can also compensate for camera roll - functionality that, as yet, only Pentax and Olympus have implemented.

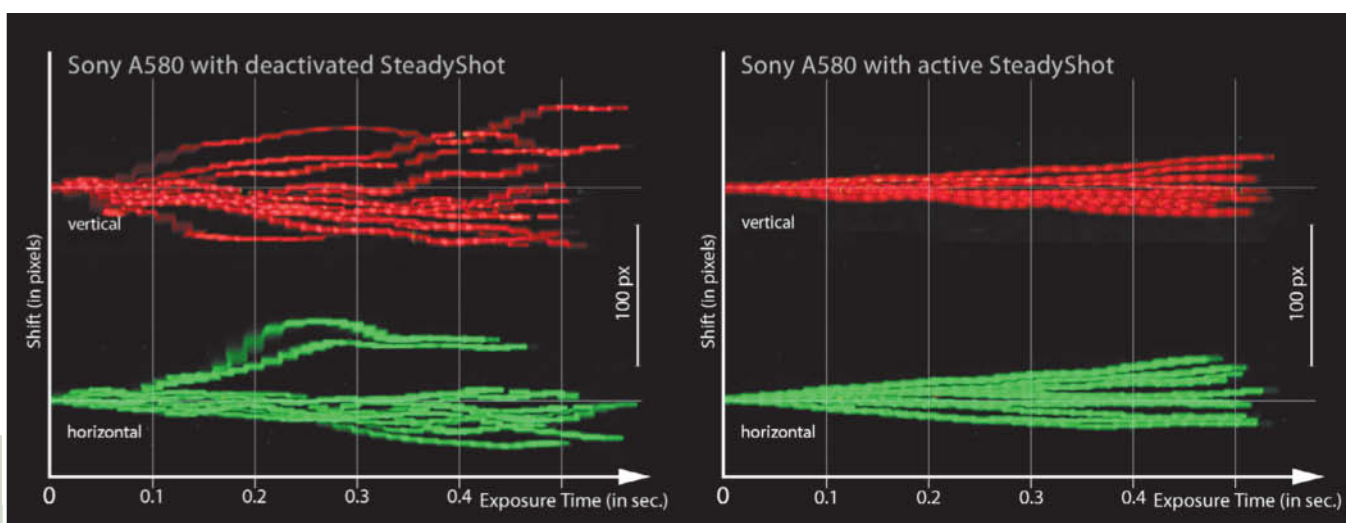
### Disadvantages:

- Optical viewfinders are not stabilized, whereas some electronic viewfinders are
- Shifting the entire sensor unit is a more complex operation than shifting a single correction lens, potentially increasing reaction times
- The sensor cannot be moved outside the image circle projected by the lens, which limits the range of compensation, especially for telephoto lenses

- Teleconverters, extension tubes and bellows render the system unusable

## Conclusions

Even the most sophisticated hi-tech image stabilizers can't perform miracles, and nothing beats a stable camera support. At exposure times of 1/60 s and longer, it is virtually impossible to capture sharp images from a moving car, regardless of which



The graph for the Sony A580 demonstrates that sensor shift stabilization is not appropriate for use with long exposures. In fact, this system produces a lot more drift than the Canon and Nikon systems.

camera or stabilization system you use. Stabilizers significantly reduce the effects of camera shake, but the blur that remains makes most shots unusable if they are enlarged to a size greater than a postage stamp. During our test, no more than 10 percent of all the shots we captured at 1/60s or more were even halfway usable. The results we produced using the Kenyon gyro stabilizer weren't much better either, but that probably has a lot to do with our lack of experience using the device.

Whichever system we tried, activating image stabilization noticeably improved our hit rate, especially for exposure times between 1/60 and 1/250s. We also noticed that all of our test systems produced about 10 percent flukes, with or without active stabilization. With active stabilization, we were pretty sure of capturing at least one sharp image in each sequence of 10 using an exposure time of 1/125s, and more than 25 percent of the images captured by Sony's sensor shift system were usable. Surprisingly, the Sony still led the pack at 1/250s, with more than two thirds of the

results turning out acceptable. For the same test, only 25 percent of the Canon material and about a third of the Nikon material were usable.

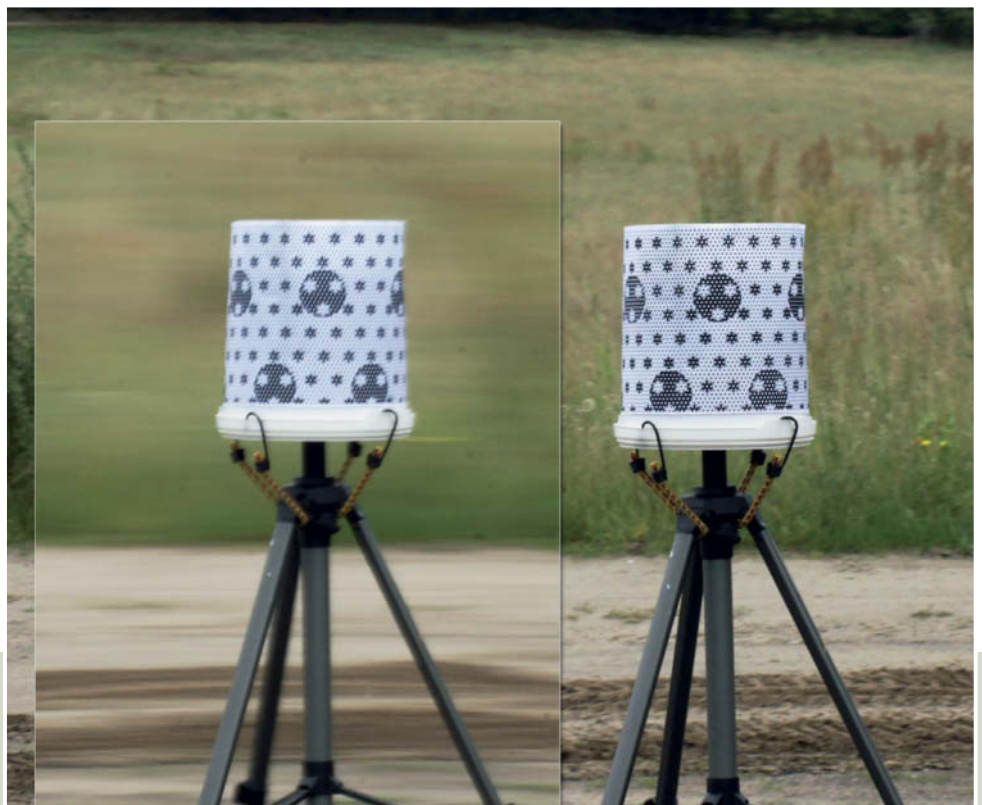
The Canon and Nikon systems often beat sensor shift systems in magazine tests, so we can only assume that our results were due to our (realistic) use of continuous shooting mode during our own test runs. If the stabilizer system doesn't have time to return to its zero position between shots, the positioning motors used to shift the correction lens quickly get 'confused'. Canon confirmed this assumption when asked, but Nikon and Sony didn't respond.

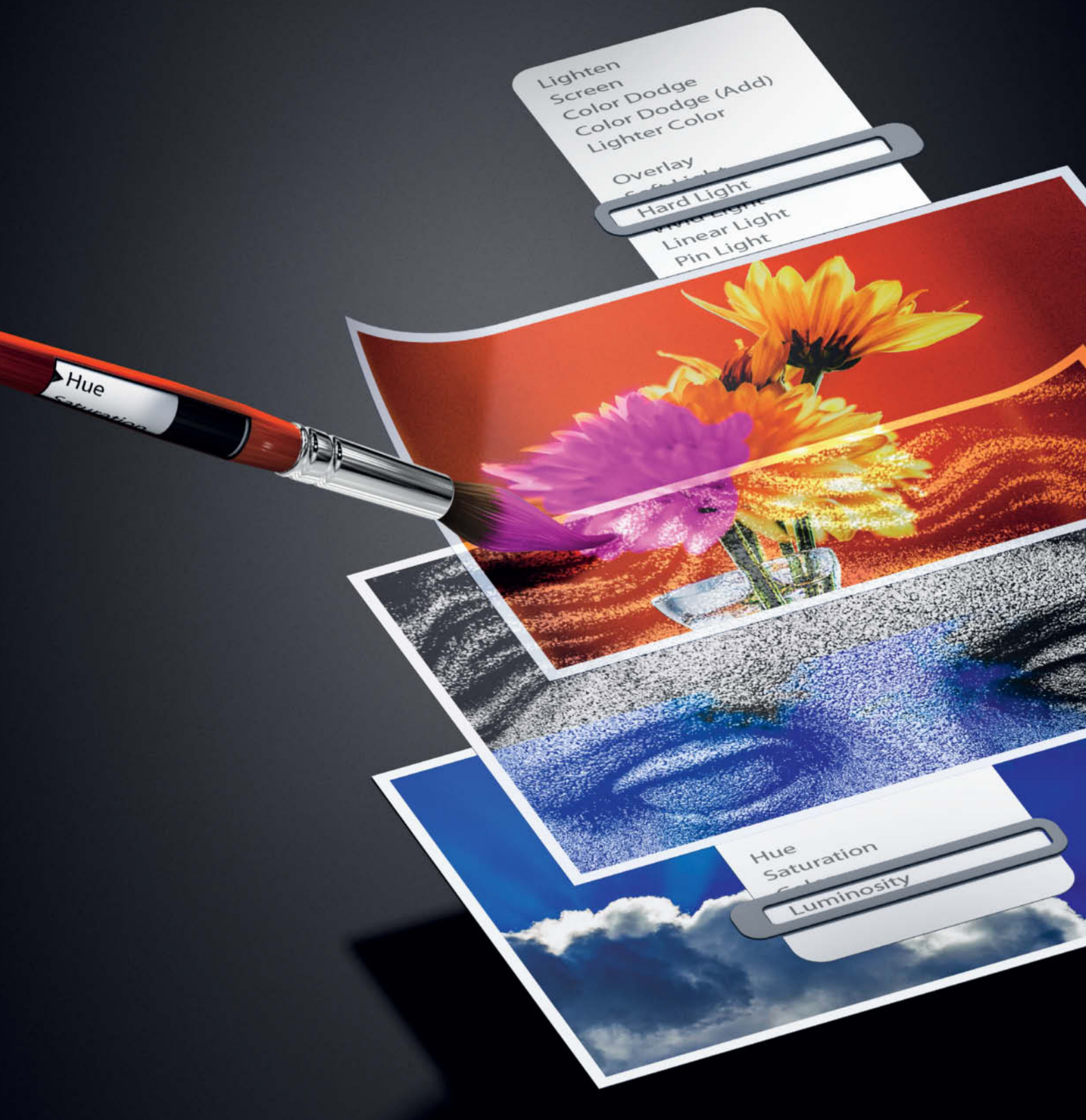
We had hoped that our handheld test shots taken from stable ground would enable us to capture effectively stabilized long exposures. For this part of our test, we provided basic stability using a monopod, shoulder pod or gyro before shooting our test sequences. Theoretically, having established a stable shooting position, we should be able to focus on a subject for an extended period of time – provided, of course, that the situation doesn't

overextend the stabilizing system's shift limits. What we actually found is that the sensors built into our test systems simply aren't built for this kind of job. Instead of measuring the absolute position of the camera, they measure acceleration and angular velocity when the camera moves and use this data to calculate the change in position. This approach is obviously not accurate enough to keep things stable during long exposures. Our test with a tripod-mounted Sony A580 shows that the errors the system produces actually increase exponentially over time.

At the end of the day, nothing beats a high-quality tripod if you want to take photos using long exposure times. If you are shooting handheld, advanced breathing techniques and mechanical aids are often more effective than electronic systems. However, electronic systems really come into their own in the shutter speed range between a few tenths and a few hundredths of a second, where they make it possible to capture photos that were unthinkable just a few years ago. (keh) **ct**

Even with active stabilization, the shot on the left (captured at 1/15 s) was a complete fluke. In this case the movement of the vehicle relative to the subject was itself an additional source of shake. With active SteadyShot and an exposure time of 1/250s, two thirds of the shots we captured with the Sony A580 turned out fine (on the right).





Michael Jordan

# Developing Images

using Blending Modes and Layer Techniques



This article not only tells you what *Photoshop's* layer techniques and blending modes are called and where to find them, it also explains how to combine them with photographic know-how to produce fantastic image editing results. There are hands-on examples that show you how to selectively improve the tones in your color and black-and-white images, and you'll also find tips on how to produce HDR images while retaining complete control of the quality and look of the results. We explain how to adjust tonal values separately for highlight and shadow areas and present subtle but effective ways of sharpening your images. And if all that isn't enough, we also let you in on the secrets of Lab mode and how to use it with blending modes to provide virtually endless creative image editing options. To help you practice, we have included the sample images used in the tutorials on this issue's free DVD.

Photographers have a lot to gain from advanced blending mode and layer techniques that go beyond simply selecting Overlay mode and playing around with opacity values. These techniques offer exciting new image editing options using just a few mouse clicks.

# What Are Blending Modes?

If you usually stick to standard tools such as Levels, Curves and Color Balance, you may well be asking yourself what Blending Modes are. However, if you are familiar with the Layers panel and its associated tools, you will probably have used blending modes (also referred to as 'layer modes') quite a lot.

You will often come across blending modes if you use the *Photoshop* Apply Image and Calculations commands. Blending modes are also an integral part of the Paintbrush, History Brush and Gradient drawing tools, as well as the Healing Brush, Clone Stamp, Blur and Dodge retouching tools.

*Photoshop CS6* includes a list of 27 different blending modes, divided into six groups.

✓ Normal
Dissolve
Darken
Multiply
Color Burn
Linear Burn
Darker Color
Lighten
Screen
Color Dodge
Linear Dodge (Add)
Lighter Color
Overlay
Soft Light
Hard Light
Vivid Light
Linear Light
Pin Light
Hard Mix
Difference
Exclusion
Subtract
Divide
Hue
Saturation
Color
Luminosity

The list of Blending Modes found in the Layers panel or the Layer Options menu

The first group consists of the Normal and Dissolve modes, which have no obvious effect. The modes in the second group darken an image and those in the third are used to perform general image lightening. The fourth group makes dark tonal values even darker while brightening lighter ones, and the fifth group creates a mathematical relationship between the two basic tonal areas. The sixth and final group combines tonal values, saturation, color and luminosity in a variety of ways.

Generally speaking, blending modes are used to merge various types of image data. In order to perform this task successfully, all the data that you wish to merge has to have the same basic proportions so that the individual positions in the images being merged are precisely mapped to one another. If you imagine two overhead projector transparencies laid on top of each other, each point on the top transparency corresponds precisely to the one underneath it, which is exactly how blending modes merge points within separate images. In other words, the first pixel on the first row is merged with the corresponding pixel on the layer beneath and so on, through to the final pixel in the bottom row of image data.

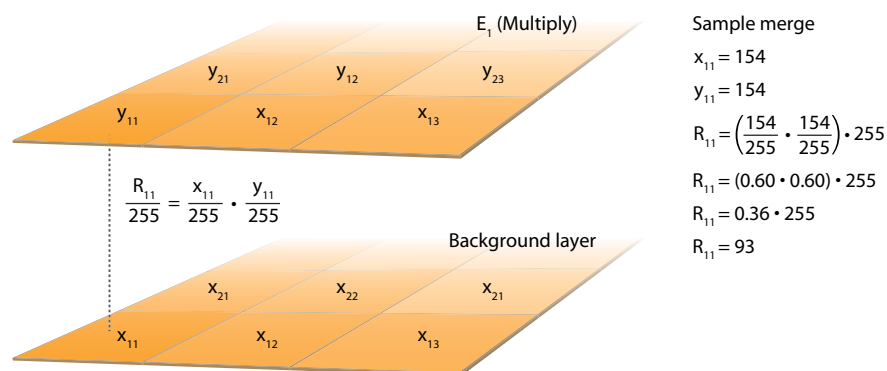
This way, images, layers and channels of the same size can be merged either with each other or with duplicates of themselves. Eight-bit RGB images are saved in the form of separate red, green and blue channels, each of which contains a maximum of 256 different tonal values (between 0 and 255). If these

tonal values are multiplied (i.e., 256 x 256 x 256), the result is the well-known total of 16.7 million different colors that an 8-bit image can contain – a gamut that provides a huge range of nuances. If you imagine each of these colors as a one-millimeter strip, the ribbon they would form would be 16.7 kilometers (about 10½ miles) long. Imagine merging two of these ribbons, and it quickly becomes clear why it can be quite tricky to keep track of what's going on when applying blending modes.

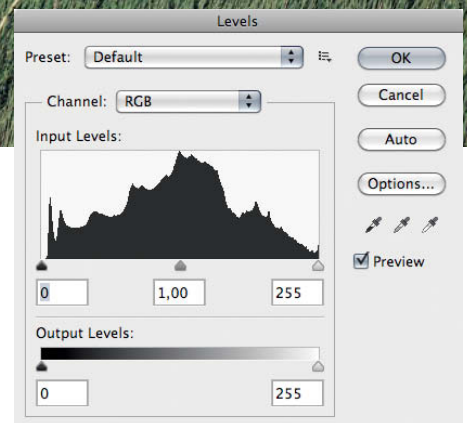
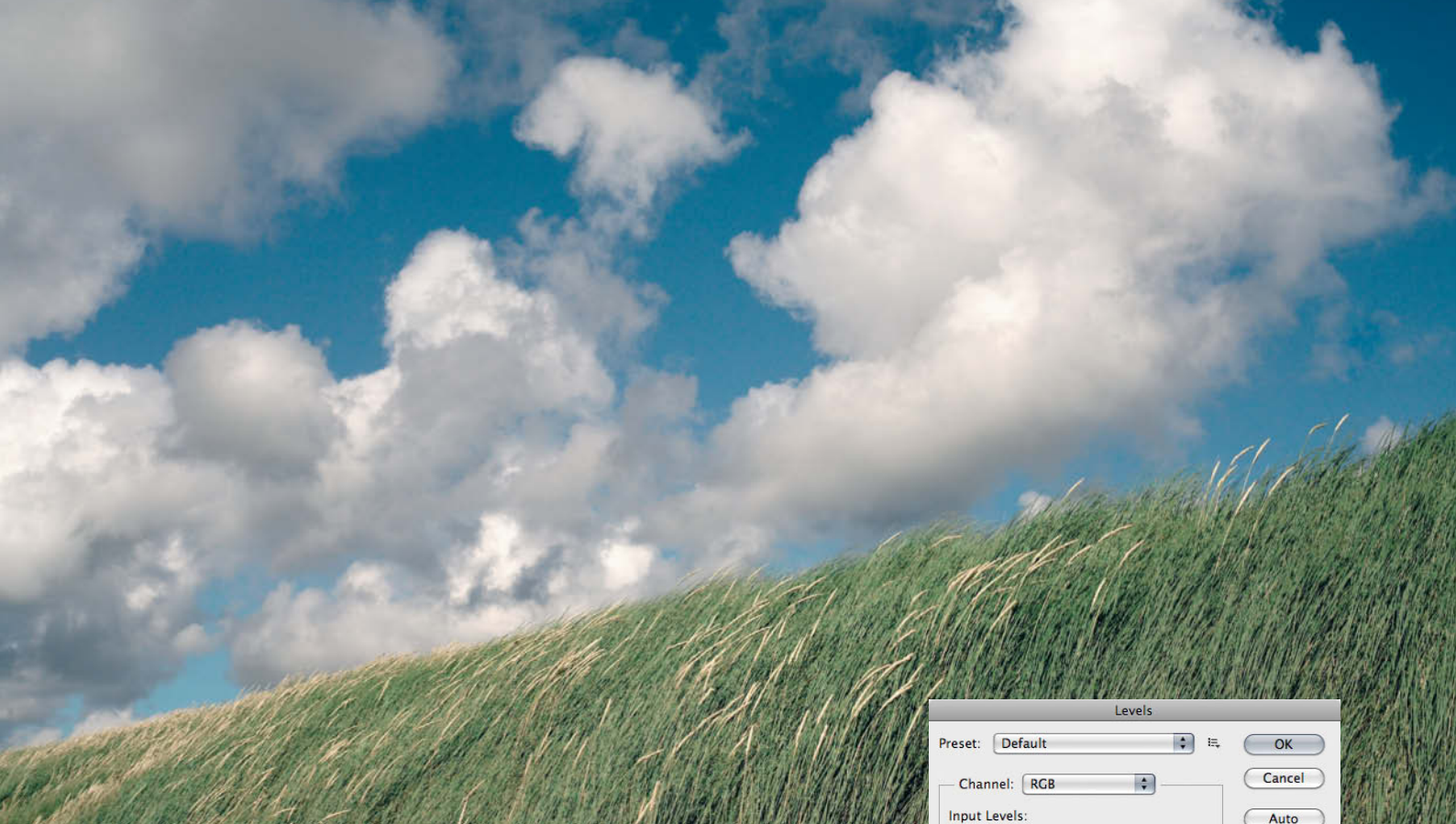
To begin with, it is sufficient to note that blending modes can be used to merge image data from images, layers or channels that are the same size. The results either show no changes (in which case you can do without blending altogether) or are brighter or darker than the original image. Things get really interesting when the darker areas of the resulting image are darker than the original but the brighter parts are lighter.

So now you know that there are 27 different blending modes that can be used to merge various types of paired image data. One of the two elements is the source and the other is the target. An active element is automatically considered to be the target, so if you are working with two superimposed layers, the blending mode you select will be applied to the upper of the two layers.

To select a blending mode, simply click it in the blending mode list (on a Mac, you can use the Shift-Alt-Initial shortcut, where 'Initial' represents the initial letter of the mode's name). The Darker Color, Lighter Color,



This is how blending modes work. In this case, Multiply mode transforms the two 154 tonal values ( $x_{11}$ ,  $y_{11}$ ) into a value of 93 ( $R_{11}$ ) when merged.



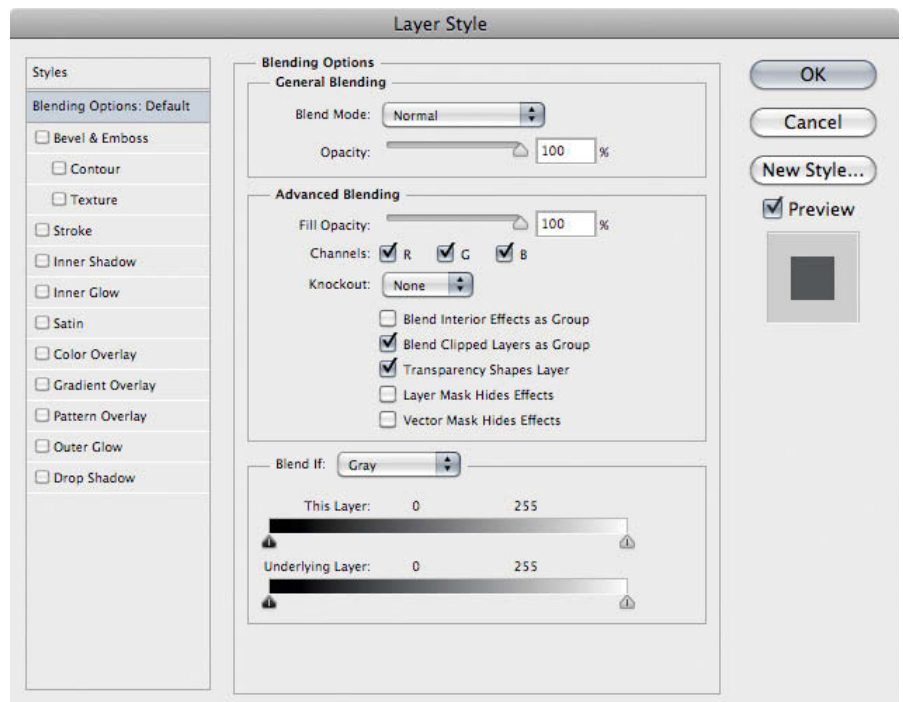
A typical landscape photo. The histogram displays tonal values covering the entire scale from 0 to 255. The individual channel views shown on page 96 provide a more detailed breakdown of their distribution.

Subtract and Divide modes are not associated with a default shortcut, but you can add your own using the Edit > Keyboard Shortcuts command.

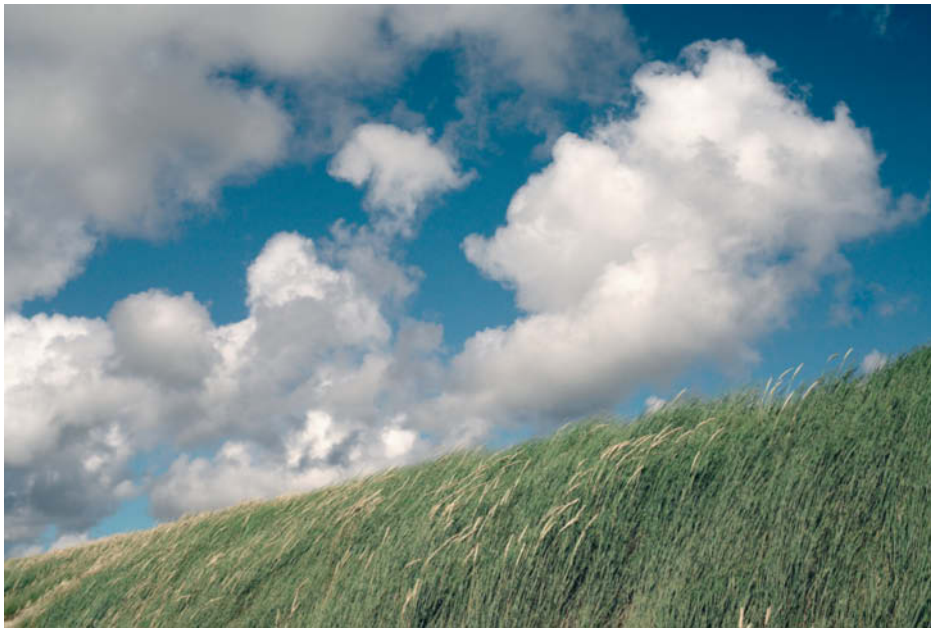
## Photographic Image Editing

If you grew up in analog times, you will know that shooting and enlarging a black-and-white image really means capturing and reproducing the best possible range of grayscale tones. The tonal range of the film or sensor in a camera often vastly exceeds that which can be reproduced on paper. In other words, a printed image is always a tonal compromise. In the heyday of black-and-white analog photography, many people aspired to perfect tone management, and Ansel Adams' famous zone system was a pioneering attempt to optimize the relationships between the tones produced by the image capture, negative development and print enlargement processes.

Digital images, too, basically consist of grayscale values that range from pure black to white on a scale from 0 to 255 for each of the RGB channels. It is theoretically possible to adapt Adams' zone system – with its



The Layer Style dialog offers more options for fine-tuning the application of blending modes. The *Blend if* options enable you to precisely adjust the overall effect of a blend and the transitions it creates.



Once the levels have been adjusted, the resulting image displays maximum contrast and is much more dynamic than the original

values from 0 to X – to the world of digital images; although the original system was designed to create unique combinations of exposure and development parameters that only ever applied to a single image. The basic idea of influencing the various areas of brightness within the frame individually is just as valid for digital images. Blending modes are a little-known but very effective tool for applying just this kind of photographic adjustment, and allow you to effectively isolate and adjust highlights, midtones and shadows. Generally, each of these three zones contains about a third of the tones in an image, with shadow values ranging from 0 to 85, midtones from 86 to 170 and highlights from 171 to 255. Based on this assumed distribution, selecting your desired pixels is a matter of just a few clicks, rather than the often painstaking work involved in using *Photoshop's* various selection tools. What's more, you can then edit each of the three zones completely independently (see the workshop on page 98).

### Preparing Your Image

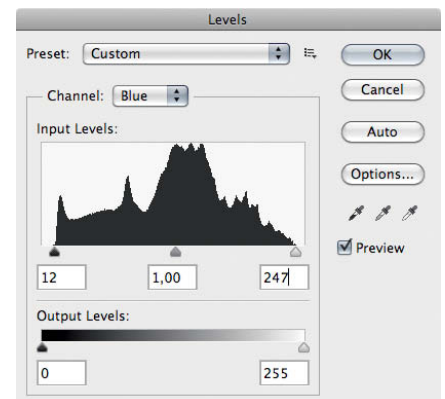
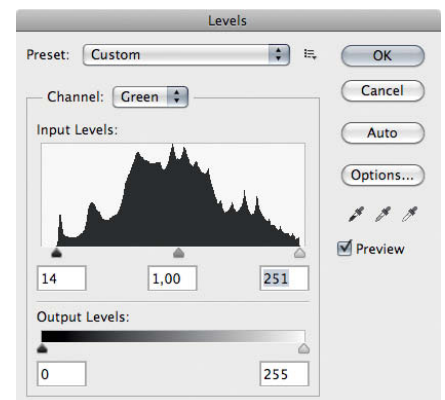
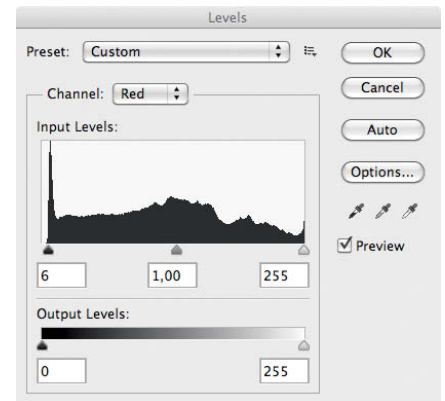
The first step in the process we are about to describe involves adjusting the levels in each color channel so that the tones it contains

cover the maximum possible range. This ensures that the results are as dynamic as possible, and the results will be just as good whether you use the Curves tool or the Levels tool to make the adjustment.

### Adjusting Levels

When you open it, the Levels dialog looks much like the one shown on page 95. Here, the overall shape of the curve is less important than the behavior of its two ends. Your image will display maximum contrast (i.e., it will contain the maximum possible range of tonal values) if the curve actually touches both ends of the tonal scale.

In order to achieve maximum image quality, you will need to adjust each color channel individually. The illustrations above right show just how different the distribution of tonal values in the channels can be. Moving the black point and white point input sliders toward the center of the scale distributes the available tonal values across the entire scale and, if you hold down the ALT key while doing so, the preview will show clipped areas (i.e., ones that are completely black or completely white) in the resulting image. Once the slider reaches the end of the histogram curve, the associated pixels will be shown in color in the preview image.



Comparing the individual color channels shows how important it is to adjust contrast separately for all three

The adjusted image has a lot more contrast and will look more dynamic. The differences this type of adjustment make can be quite dramatic, but your results will always depend on the quality of your source material.



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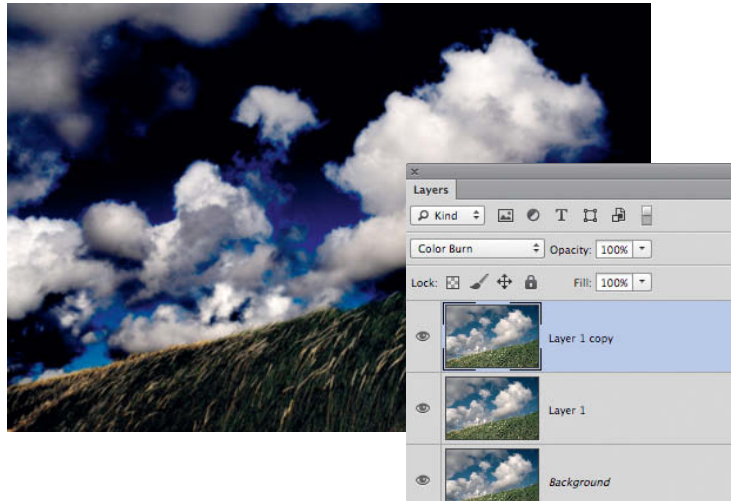
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## Adjusting Highlights, Midtones and Shadows

This workshop demonstrates how to create masks that allow you to adjust highlights, shadows, and midtones separately. This approach enables you to optimize one zone at a time once you have adjusted the basic color levels in your image.

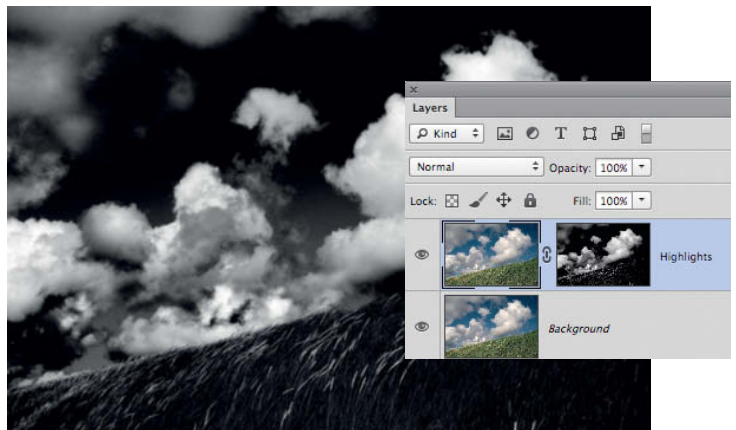
### Step 1

**Prepare your mask:** Duplicate the background layer twice using the Duplicate Layer command in the Layer menu. Select the Color Burn blending mode for the uppermost layer and merge the two upper layers into one. Use the Select > All command (or the Ctrl/Cmd+A shortcut) and copy the resulting selection using the Edit > Copy command (Ctrl/Cmd+C). The selection is now stored on the clipboard. Now hide this layer by clicking its eye icon in the Layers panel.



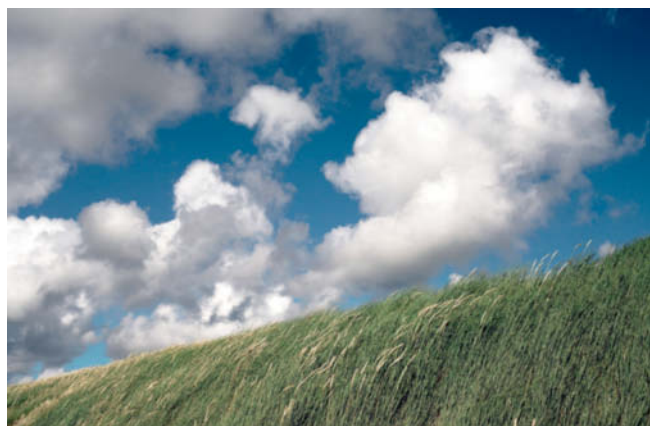
### Step 2

**Mask the shadows and midtones:** Duplicate the background layer once again and rename the new layer 'Highlights'. Create a new mask using the Layer > Layer Mask > Reveal All command and paste the contents of the clipboard into it by holding down the Alt key and clicking the mask, followed by the Edit > Paste command (Ctrl/Cmd+V). The shadows and midtones are now masked, and you can delete the hidden layer.



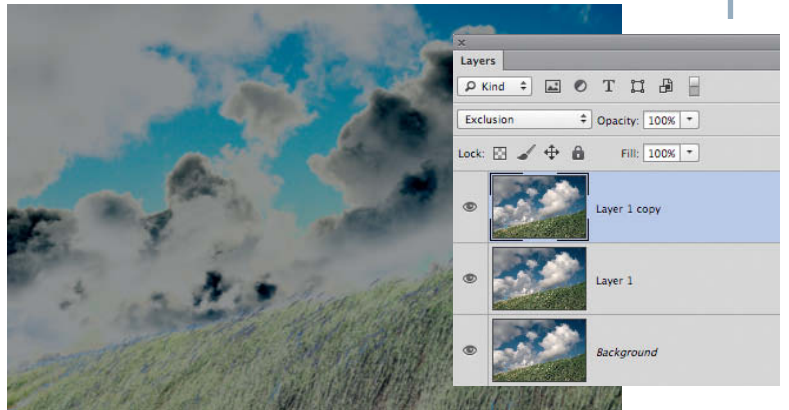
### Step 3

**Brighten the highlights:** Any levels adjustments you make to the 'Highlights' layer – for example, using the Hard Light blending mode – now only affect the bright image areas. You can also use Curves to adjust the highlights. The fact that the midtones and shadows are masked gives you a lot of leeway for your adjustments and allows you to experiment with settings that would be too extreme for application in an unmasked image.

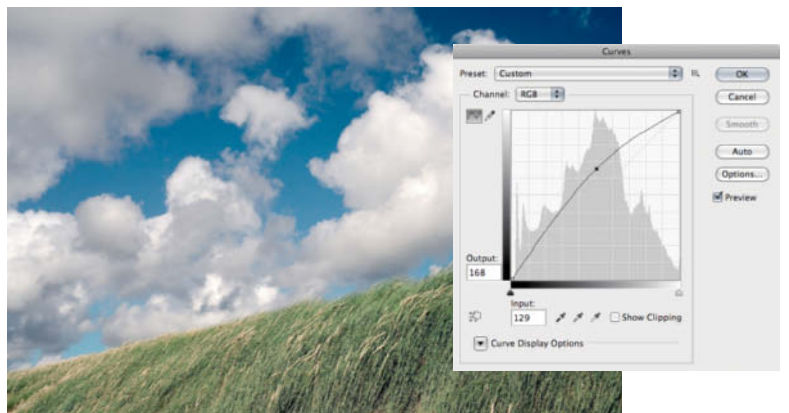


**Step 4**

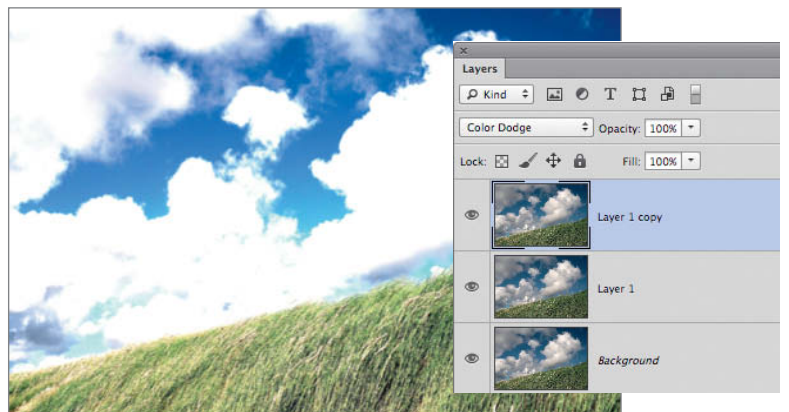
**Prepare to adjust midtones:** The method here is basically the same as for the highlights. Duplicate the background layer twice and select Exclusion blending mode. Merge the two upper layers into one, select all, copy the result to the clipboard and hide the new layer. Duplicate the background layer again and call it 'Midtones'. Create a mask and activate it by clicking it with the Alt key pressed. Now paste the contents of the clipboard into the mask and delete the hidden layer.

**Step 5**

**Adjust the midtones:** Because the brightest tones in this mask are mid-gray, adjustments to the midtones won't have a particularly marked effect. If you want to produce a more obvious effect, you can always use the Curves or Levels tools to increase dynamic range. To brighten the Midtones layer, use either the Curves tool as shown, or an appropriate blending mode.

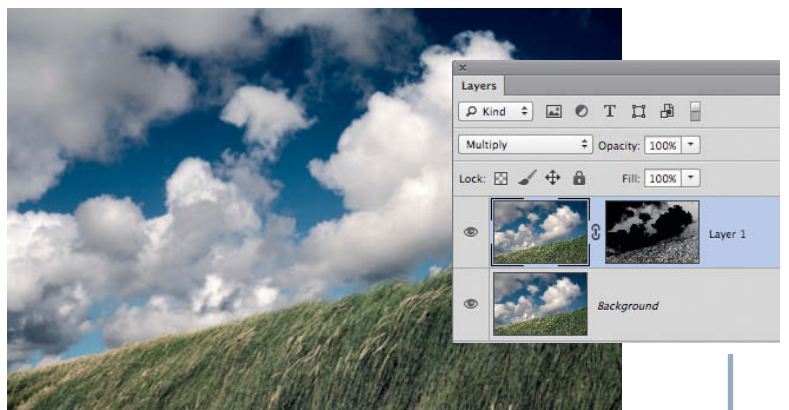
**Step 6**

**Prepare to adjust the shadows:** Once again, duplicate the background layer twice. This time, select the Color Dodge blending mode. Once you have merged the two upper layers, copied the result and hidden the new layer, you can duplicate the background layer and call it 'Shadows'. Create a mask, insert the clipboard contents and invert the mask using the Image > Adjustments > Invert command. This creates a shadows mask. Now delete the hidden layer.

**Step 7**

**Adjust the shadows:** You can darken the Shadows layer using either Multiply blending mode or the Curves tool.

As you can see, creating zone masks is quick and easy, and is even faster if you use Actions to create your masks. You can even record a single Action to create all three masks in one routine and simply delete the masks that you don't need for the image you are working on.



# Advanced Tonal Adjustments

You can use the techniques introduced in the workshop on page 98 to fine-tune the three basic tonal zones in black-and-white images too.

Using the individual RGB channels within the Curves or Levels tools gives you even more ways to use zone masks to enhance your images. Adjusting the individual color channels within each zone enables you to apply sophisticated effects like those you can produce using the *Lightroom* Split Toning tool, which allows you to finely balance the adjustments you make to the individual zones.

Subtle adjustments to highlights and shadows can make black-and-white images seem more three-dimensional, especially if the differences between your tweaked image and a conventional grayscale version are not immediately obvious. For the portrait of a child shown below, we created and adjusted shadow and highlight masks to achieve the effect we were looking for. In this case, a slight lift in the red channel curve was all that was required to add warmth to the shadow areas.

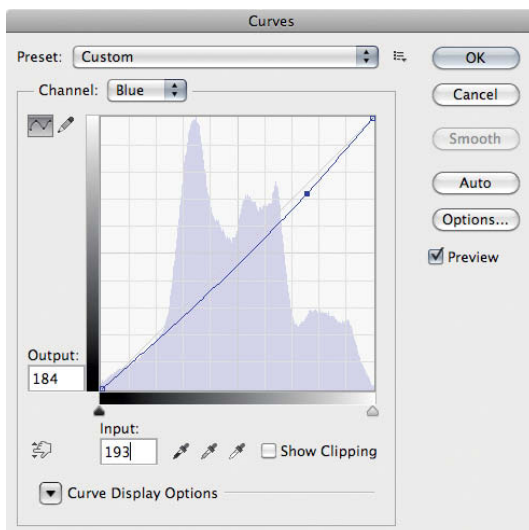
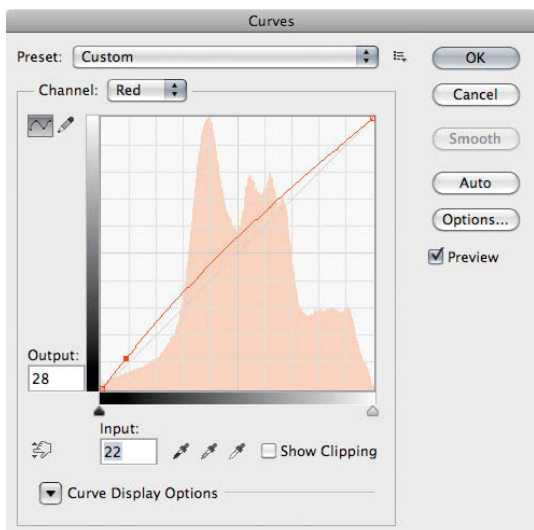
Similarly, lowering the blue channel curve for the highlights also warmed up the

brighter areas. The result is very subtle and gives the finished image added charm.

## Creating a Look

The possibilities are virtually endless, and you can achieve similar effects to the monochrome ones described here in color images using any or all of the color channels in any combination of the zone masks we have already created. Green is the dominant color in both the light and dark the areas in the image of an ornamental leek bud shown opposite. Increasing the red component in

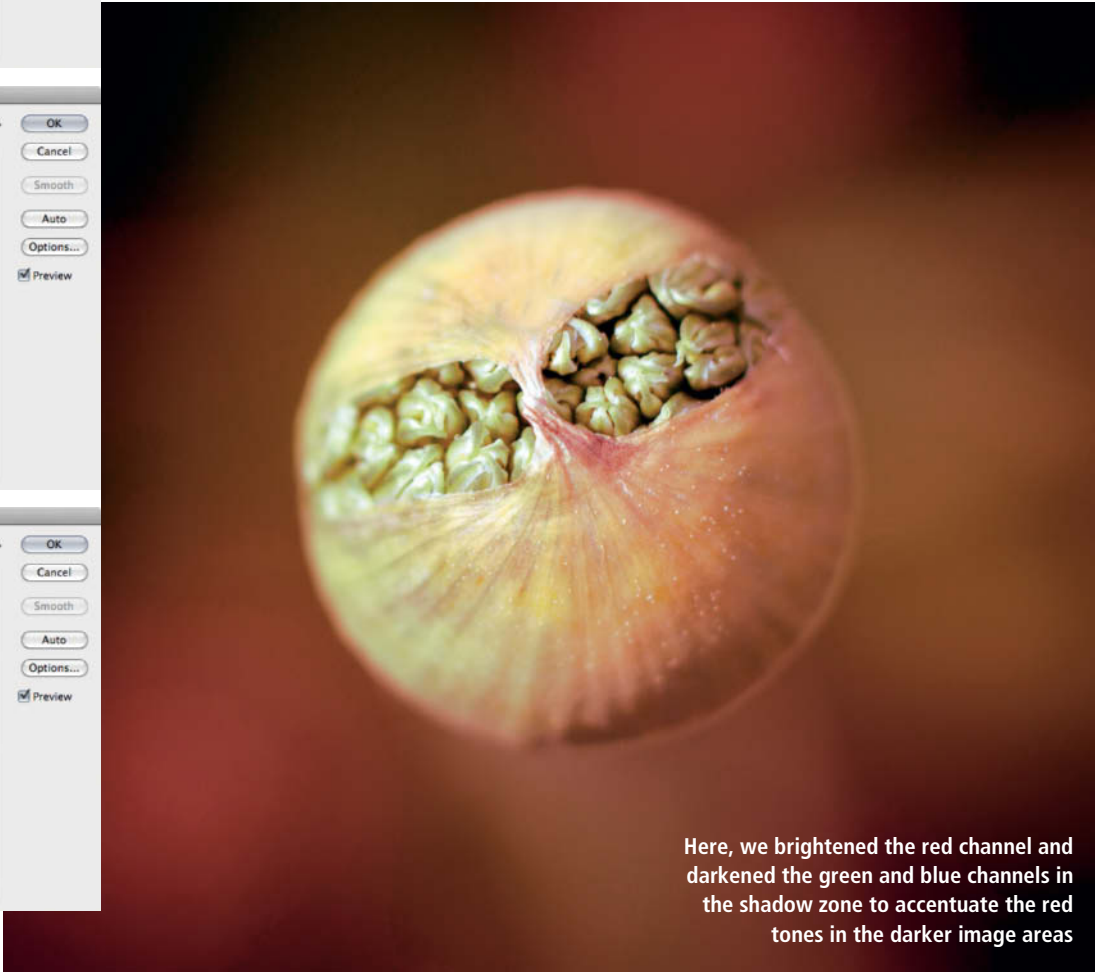
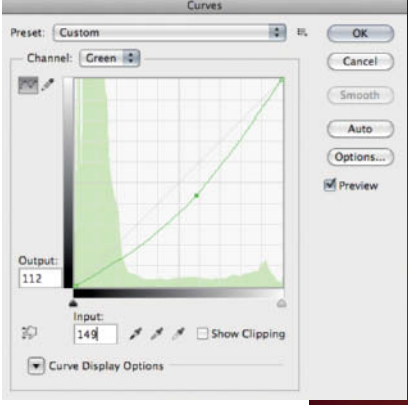
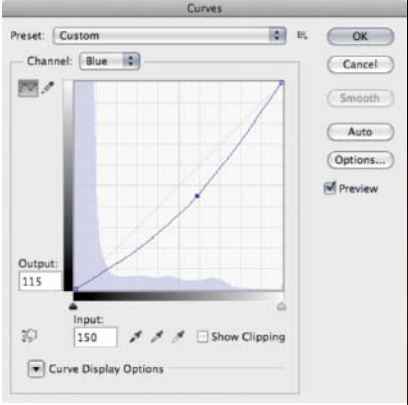
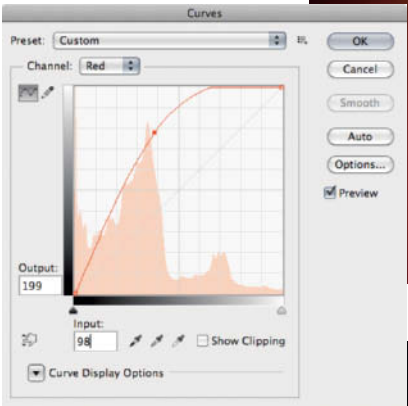
Continued on page 104



Subtle adjustments to the individual color channels in the shadow and highlight zones give this black-and-white image extra impact



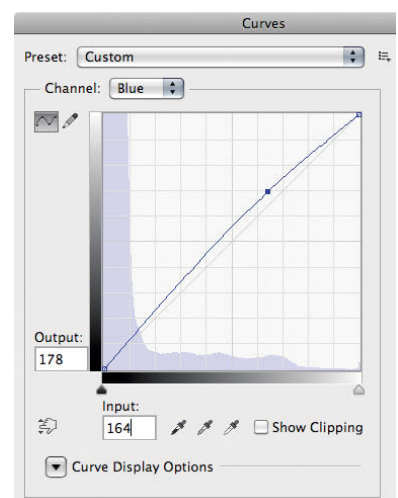
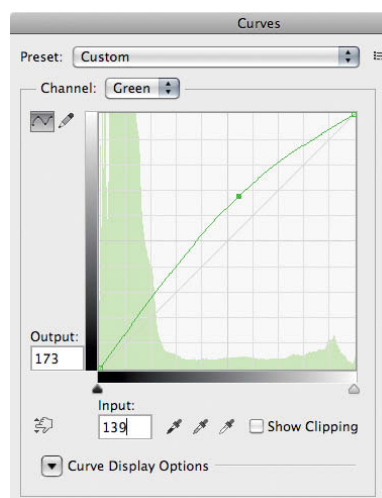
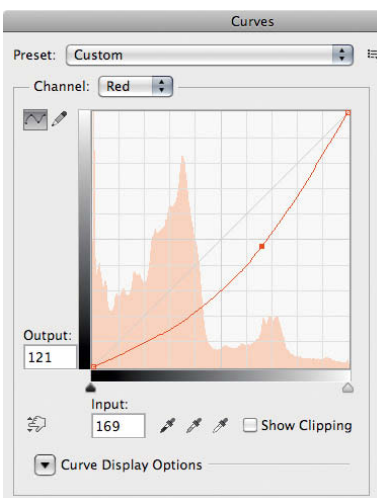
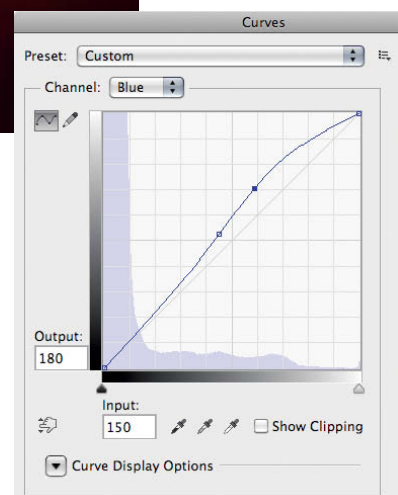
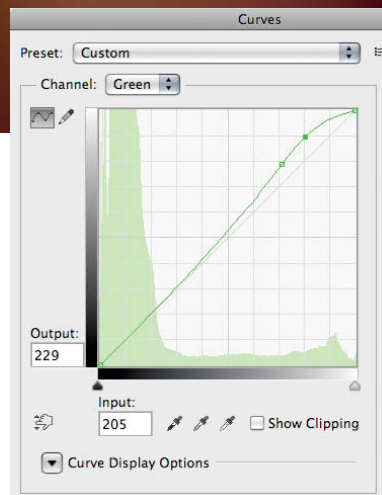
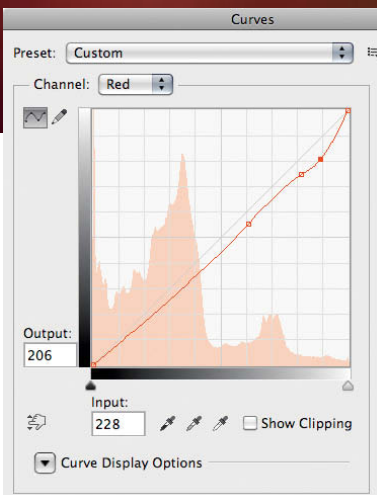
Using blending modes and the Curves tool, you can produce enhanced color looks like this one with just a few clicks



Here, we brightened the red channel and darkened the green and blue channels in the shadow zone to accentuate the red tones in the darker image areas



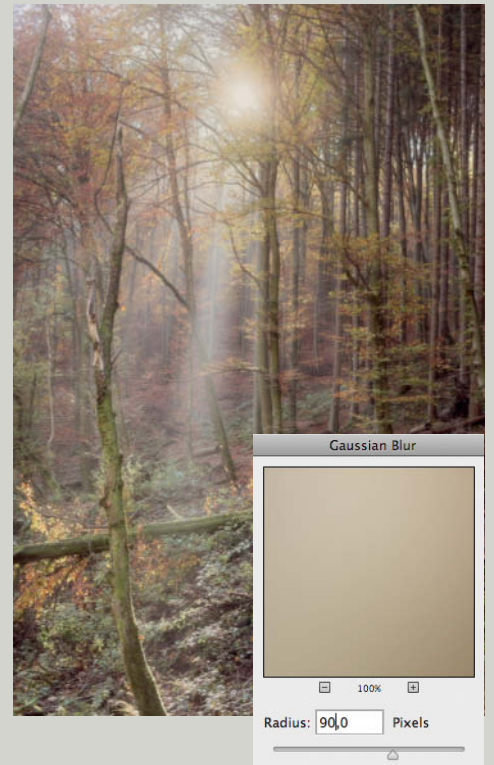
Simultaneously reducing the red component while increasing the green and blue levels gives the midtones a cooler look



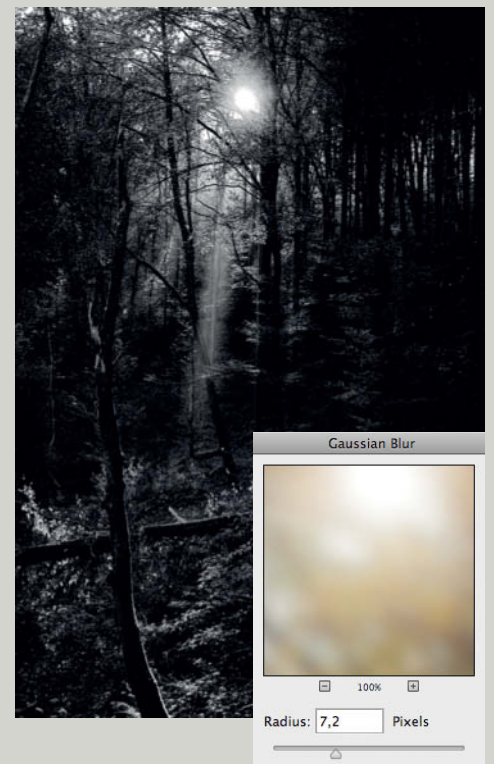
Highlights react in a similar way to midtones, producing a cold/warm contrast alongside the light/dark contrast that already exists between the highlight and shadow areas



Deliberately blurred highlights can give a photo a filmy, rather romantic feel



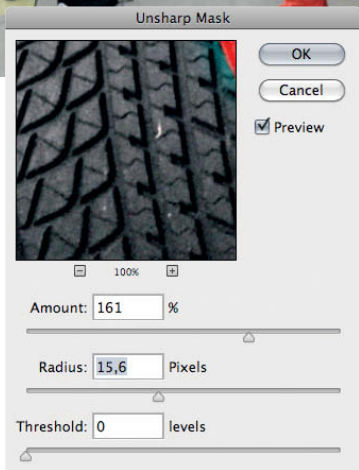
Because the higher Radius setting also includes pixels taken from the yellow leaves, a strong blur effects gives the sun an exaggeratedly yellow tint



The mask shows precisely which parts of the image are affected by the added blur



It doesn't always make sense to sharpen the entire image. Subtle partial sharpening in the shadow areas is often more effective, as shown here in the detail of the tire.



The Shadows mask shows which parts of the image will be affected. Using masks allows you to apply much more radical effects than you can when sharpening an unmasked image.

the shadows offers an effective counterpoint to the green-tinged highlights. To begin with, we adjusted each channel by eye until we achieved a satisfactory look for the darker tones.

We then adjusted the midtones channel by channel, reducing the red component and increasing the green and blue levels. Adjusting the upper end of a curve more than the lower end ensures that effect on

the midtone areas is more pronounced. Finally, we applied similar adjustments to the individual highlight channels, again reducing the red component and increasing the green and blue levels. You can, of



course, adjust the overall brightness for any or all of the zones using the combined RGB curve.

## Romantic Highlights

Blur effects can also be used to alter the effect of the highlights in an image. Selective blur often gives portraits and landscapes a characteristic look of their own.

To apply a selective blur effect, duplicate the background layer twice and select the Color Burn blending mode for the upper layer. Merge the two upper layers, copy the new layer to the clipboard and then delete it. You can then duplicate the background layer again, create a new mask and paste the contents of the clipboard into it.

Now apply the Gaussian Blur filter to the duplicate background layer. The effect you achieve will depend on your Radius setting,

which will itself depend on the size of the image you are working on. In our backlit forest example on page 103, you can see the results of applying radius settings of 7.2 and 90. The blur filter darkens the highlights; to counteract it you will have to apply a Curves adjustment or use a blending mode such as Screen from the third group in the list.

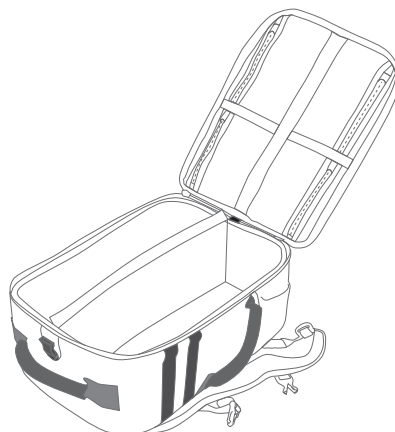
## Subtle Sharpening

The logical counterpoint to blurred highlights is sharpened shadows. The brighter areas in many images tend to look rather two-dimensional, so the general impression of sharpness is determined more by the sharpness of the shadow details. To enhance this effect, create a shadow zone mask, copy the background layer twice and select Color Dodge blending mode for the

uppermost layer. As previously, you then have to merge the two upper layers, copy the resulting content to the clipboard and delete the layer. Then make a new copy of the background layer and create a mask that you then fill with the contents of the clipboard. Invert the new layer using the Image > Adjustments > Invert command. Again, you can save a lot of time by recording these steps in an Action, especially if you use shadow masks regularly.

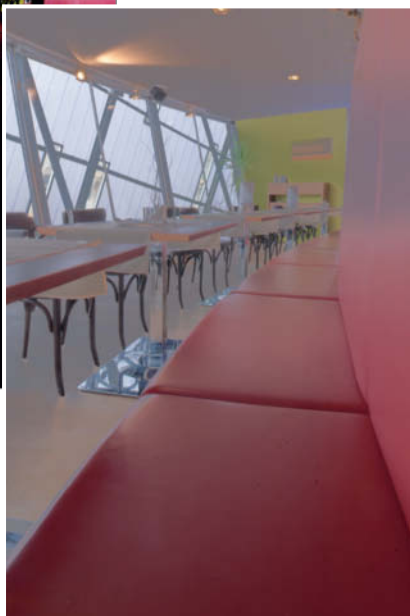
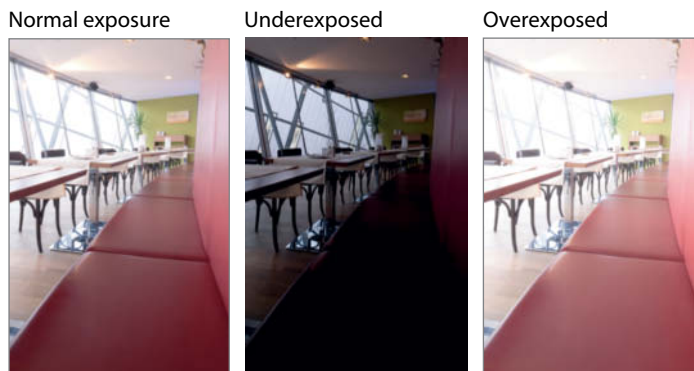
You can now apply the Unsharp Mask filter to your new layer. As with the other effects we have described, you can apply much more extreme values to a masked image than you can use on a conventional image layer. Using this approach, you can selectively increase contrast in the darker areas of your image – as we have with our race car photo – which not only increases sharpness, but also adds depth.

# inspiration



## Creating HDR Effects Using Blending Modes

Another way to use your new knowledge of blending modes is to create enhanced-contrast images. All you need is a high-contrast subject that you capture in three separate images, one using exposure settings that produce a 'normal' image and two others that capture all the highlight and shadow detail. The 'normal' image should be exposed at a level that approximately represents the overall brightness that you want your finished HDR image to have. Use a tripod to ensure that the three images can be perfectly superimposed.

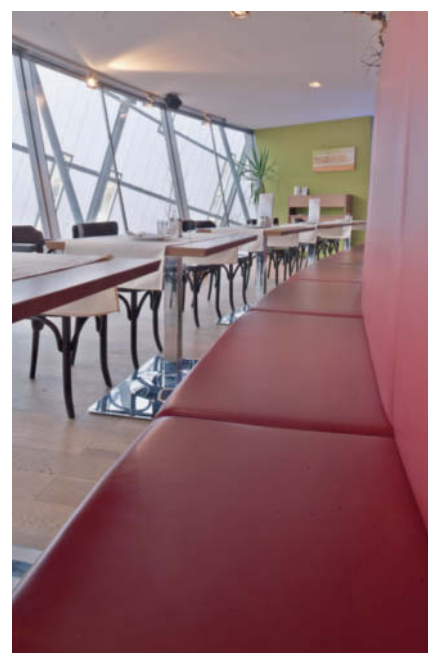
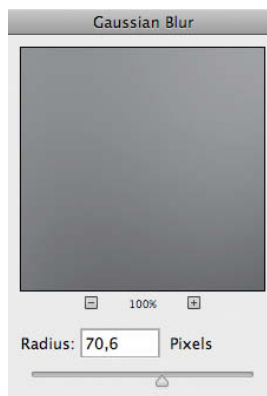


### Step 1

**Create a highlight mask:** Open all three source images in *Photoshop* and use the 'normally' exposed image as the basis for the step-by-step creation of HDR shadow and highlight masks. Duplicate the background layer twice and select the Color Burn blending mode for the upper layer. Merge the two upper layers and call the resulting layer 'Highlight Mask'. Now switch to the source image with the shortest exposure time (i.e., the underexposed one in which the highlights show maximum detail) and copy it to the clipboard. Switch back to the normally exposed image and paste the contents of the clipboard onto a new layer called 'HDR Highlights'. Create a new mask and activate the 'Highlight Mask' layer. Use the Select All command and copy the resulting selection before deleting the 'Highlight Mask' layer. Now paste the copied mask into your newly created mask by clicking the mask with the Alt key pressed, followed by the Ctrl/Cmd+V shortcut. The resulting image now has good highlight detail, but doesn't yet look convincing.

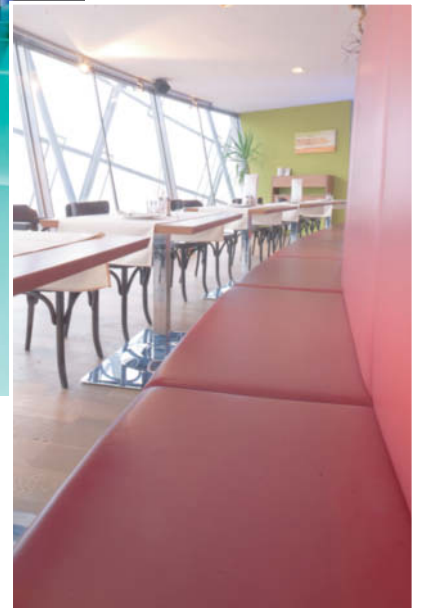
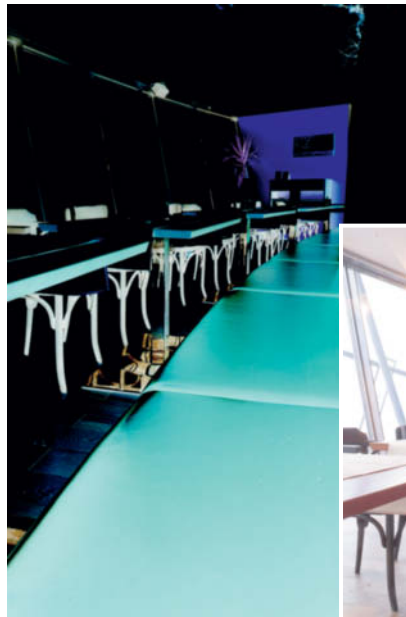
### Step 2

**Fine-tune the highlight mask:** Paying attention to the transitions between the highlights and midtones as well as the general feel of the image, reduce the opacity of the highlight mask layer until the highlights show just the right level of brightness and apply the Gaussian Blur filter. Larger Radius values make these transitions softer. Once you have found the right Radius setting, you can re-adjust brightness if necessary.



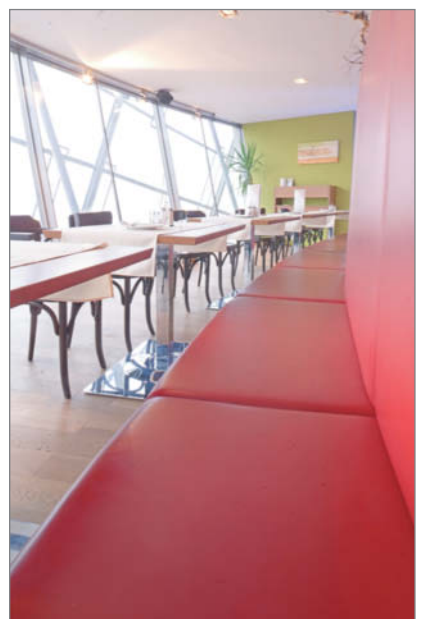
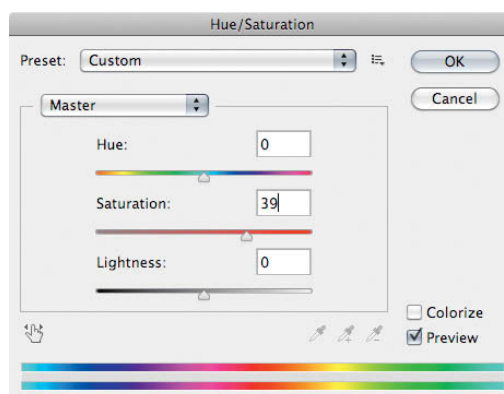
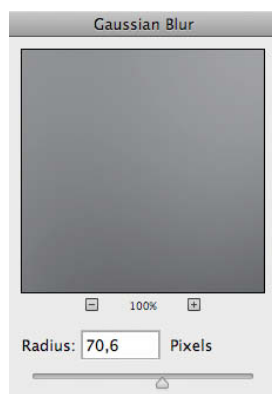
**Step 3**

**Create a shadow mask:** Hide the 'HDR Highlights' mask and duplicate the background layer twice. Select the Color Dodge blending mode for the upper duplicate, merge the two upper layers and invert the result using the Image > Adjustments > Invert command. Call the result 'Shadow Mask'. Now switch to the overexposed image (i.e., the one with the longest exposure time and good shadow detail). This means that the brightest source image is responsible for creating the darkest parts of the finished image. Select the entire image and copy it to the clipboard. Now switch back to the 'normal' image and paste the new contents of the clipboard to a new 'HDR Shadows' layer. Create a new mask, activate the 'Shadow Mask' layer, apply the Select All command (Ctrl/Cmd+A), copy the resulting selection and delete the 'Shadow Mask' layer. Paste the copied mask into the 'HDR Shadows' layer by clicking the mask with the Alt key pressed followed by the Ctrl/Cmd+V shortcut.

**Step 4**

**Fine-tune the Shadow mask:** The 'HDR Shadows' layer we have created looks OK, but could benefit from a little tweaking using the Gaussian Blur filter, though with a much smaller Radius setting than the one we used for the highlight image. Increase the saturation of the 'HDR Shadows' layer using the Image > Adjustments > Hue/Saturation command to accent the shadow tones. Once you are happy with all your shadow and highlight settings, you can merge all your layers into one before making any final global adjustments to contrast and brightness. This is the point at which you can apply additional sharpening too, if you wish.

However you decide to apply these techniques, the masks we have created and the uses of blending modes and layers that we have outlined are very useful for identifying the highlight and shadow details you want to emphasize and the effects of the adjustments you make to them.



## Advanced Blending Mode Techniques

Some users consider the High Pass filter to be a strange and exotic tool, while others find it an indispensable aid to everyday image editing. The filter 'thinks' somewhat out of the box but, once you have understood how it works, there are many ways to apply it effectively. However, you can only realize its full potential if you use it in combination with blending modes. The five tone levels included in a grayscale wedge illustrate the filter's principle very well, as they represent tonal values of 0, 64, 128, 192 and 255 in all three RGB channels (i.e., tonal variations at regular intervals).

### The High Pass Filter

The High Pass filter can be found in the *Photoshop* Filter menu under Filter > Other. When applying the filter to a grayscale wedge, you can select Radius values between 0.1 and 250 pixels, and the effect is only visible at obvious edges (i.e., where there is contrast). Where there is no contrast, the filter produces mid-gray pixels. The filter can be applied to

any layer (including the background), although this doesn't make much sense, as you will see if you try applying it to a grayscale wedge as an experiment.

An edge is produced where dark and light image areas meet, and applying the High Pass filter produces a dark line on the dark side and a bright line on the bright side of the edge. The larger the Radius value you use, the broader these lines will become, up to the point at which they form a visible, medium gray band. In our example opposite, the dark-to-light transition moves from left to right, which means that the dark bands form on the left and the bright ones on the right when the High Pass filter is applied. A Radius value of 3.0 produces a fine edge line and the remaining tonal bands all turn to mid-gray.

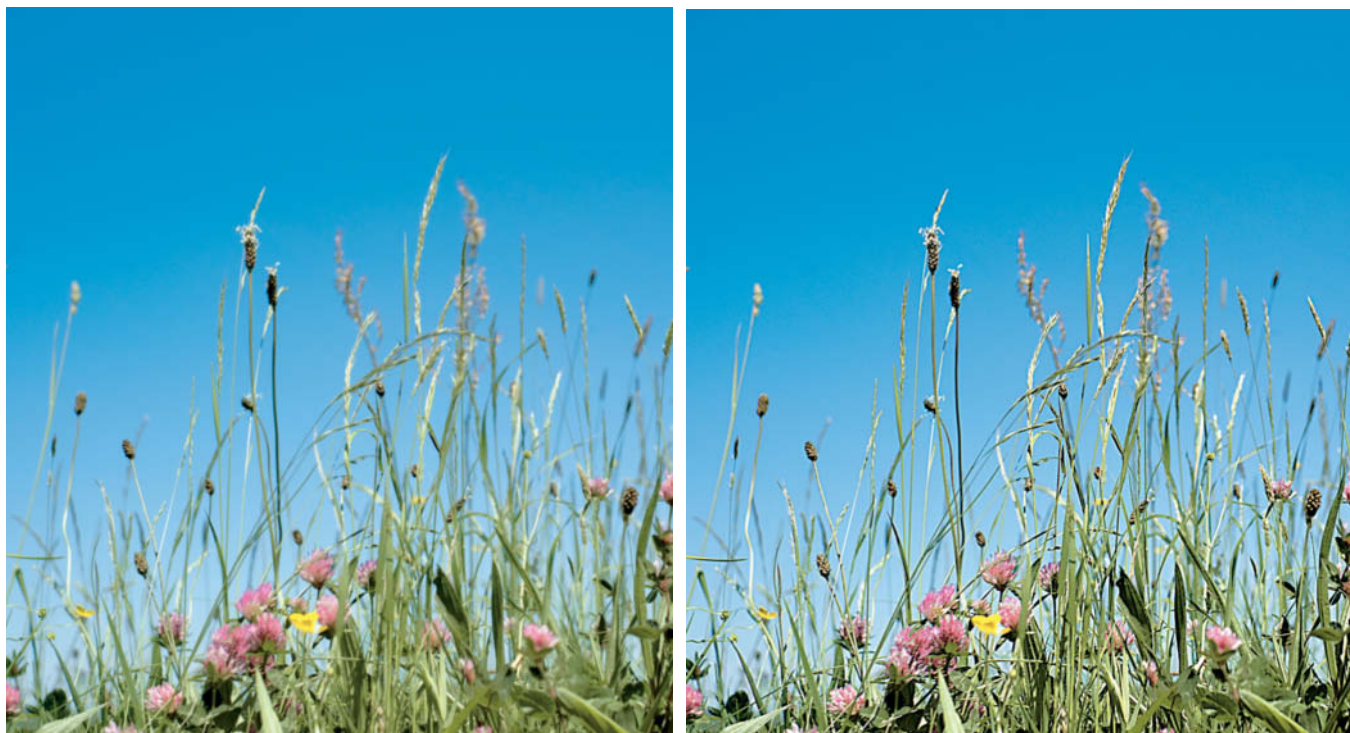
If we apply a much larger Radius value, such as the 90 we used in our example, the edge lines are transformed into broad gradients, making it impossible to tell how the original image might have looked by studying the results produced by the filter. If your source image doesn't contain any distinct

changes in tone (i.e., edges), applying the High Pass filter will produce consistent gray tones throughout the frame, irrespective of the Radius value you use.

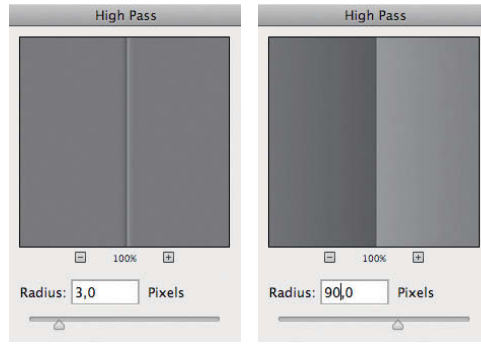
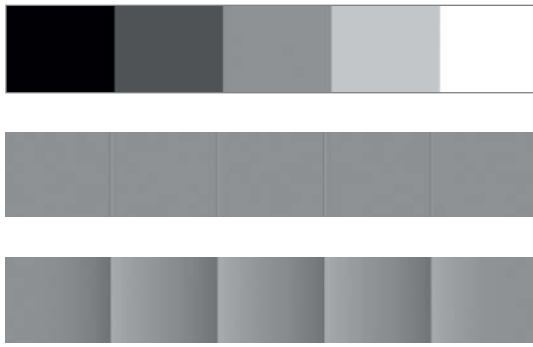
At first glance, the High Pass filter doesn't have any obvious uses in a photographic context. The only exceptions are if you use it with blending modes or to create a mask for isolating edges that you wish to tweak selectively.

In order to apply blending modes, you have to duplicate the background layer first and apply the High Pass filter to the copy.

The blending modes from the fourth group apply effects similar to that produced by applying an S-curve with the Curves tool – i.e., they brighten highlights and darken shadows – and combine well with the High Pass filter. If you merge any tonal value from one layer with mid-gray from another using a blending mode from the fourth group, the original brightness will remain unchanged in the parts of the original image where gray pixels are located. These blending modes only have an effect in places where non-mid-gray



Photos with well-defined monotone areas, such as the sky in this photo, can benefit from sharpening using the High Pass filter. The filter sharpens only edges, leaving detail in major shapes untouched and preserving overall image data quality.



We used a grayscale wedge to represent the range of tones within an image. Applying the High Pass filter with a low Radius value produces distinct lines at the edges of the individual zones and consistently gray color fields. Higher Radius values produce distinct gradients at every edge.

tonal values are present in the original image. As we have already seen, the High Pass filter produces distinct lines at object edges, so applying it here increases edge contrast, which also sharpens the image. Soft Light is the subtlest mode of the group, while Overlay and Hard Light produce slightly stronger effects. Vivid Light and Linear Light produce the highest-contrast results of all.

The best way to get a feel for the effects produced by the High Pass filter is to apply any blending mode from the fourth group to your duplicate layer and then apply the filter. Doing things in this order makes it easier to see which Radius value best suits the image you are working on, and you can always switch to a different blending mode once you have selected the right filter settings.

### Combining Tools and Blending Modes

Blending modes can also be applied using various brushes and retouching tools. With a little practice, this direct style of application can be a lot quicker than using separate layers to apply your chosen effects, especially when you are performing minor adjustments. The

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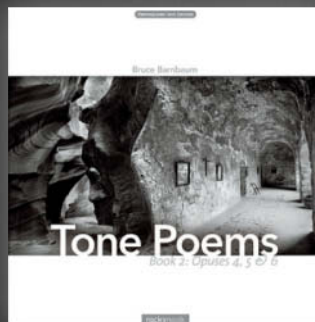
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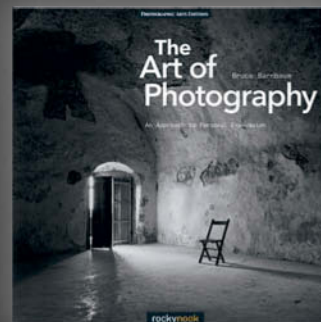
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following example uses the Brush tool to illustrate the principles involved in this particular technique.

Use the Brush tool with a low hardness value and a size setting commensurate with the image you are working on – you should be able to perform your intended adjustment with a single stroke. Select white as your color and reduce opacity to between 30 and 60%. In this case, use the Soft Light blending mode; if you are aiming to produce higher-contrast results, use Overlay (or even Hard Light). Now all you have to do is ‘paint in’ the areas you wish to brighten. If you are not satisfied with the results, use the Edit > Step Backward command or undo the step in the history panel to undo your adjustment and start again.

Using layers to achieve the same effect takes longer. If this is the approach you wish to take, first create a new layer using the Layer > New command and select an appropriate blending mode and opacity setting as described above. Select a white brush in Normal mode and set opacity to 100% with size and hardness settings as detailed in our previous example. You can now paint your adjustment into your new layer. The result is the same as the brush-based one, but can be adjusted at any time by adding to or erasing the areas you have painted.

For completeness’ sake, we would also like to mention a third technique that builds

on the second example we have just described. Instead of creating a blank layer, fill the new layer with 50% gray by using the Edit > Fill command and selecting the 50% gray option in Use drop-down in the Fill dialog. This is the same gray that blending modes such as Soft Light use. While this doesn’t actually have any effect on the results you produce, it does make it a lot easier to see where you have painted in your editing layer.

If you want to add a vignette effect to an image, you can either use a selection with a soft edge and the Levels tool, your RAW converter’s built-in tool (if available) or a large, soft brush. If you want to leave the color of your vignette as it is, use a dark neutral gray tone or black with reduced opacity. Using a color picked from the tones included in the image itself is a great way to emphasize the effect of a vignette.

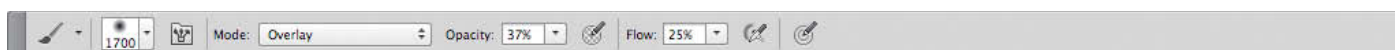
We used just a couple of brush strokes and Screen blending mode with a bright yellow/green tone and 42% opacity to brighten the background in the image of a flower bud opposite. Once again, we could have worked with separate layers, but direct use of brushes and blending modes helped us to produce a quick and effective vignette effect. This approach also allows you to use any shape you like for your vignette, an advantage that is lacking if you use a soft-edged selection or your RAW converter’s built-in tool.

## Lab and Blending Modes

To give you a taste of the real potential of blending modes, we would also like to take an excursion into the world of Lab mode adjustments. Lab mode images have three channels too, but instead of representing the colors red, green and blue, they are called *L*, *a* and *b*, where *L* stands for ‘Lightness’ and *a* and *b* represent the color-opponent dimensions described by the Lab color model. Using this model can take some getting used to (see page 112), especially if you are used to using RGB channels. However, once you have understood the principle involved, you will quickly be able to use it to produce fascinating visual effects.

To use Lab mode, convert your image using the Image > Mode > Lab Color command or the Edit > Convert to Profile dialog. Most images have sufficient contrast and are clearly visible in all three RGB channels, whereas the shapes in a Lab mode image are only really visible in the *L* channel. The *a* and *b* channels usually appear extremely pale and contain almost no recognizable detail.

The way Lab mode works becomes more apparent when you take a look at the Curves dialog produced by your image (see the illustrations on page 112). The graph for the *L* channel displays values from 0 (black) to 100 (white), while the scale in the *a* and *b* channels ranges from -128 to +127 with zero in the



For minor adjustments, such as the local tonal adjustment we applied to this cat portrait, using blending modes as direct tool settings can significantly speed up your workflow

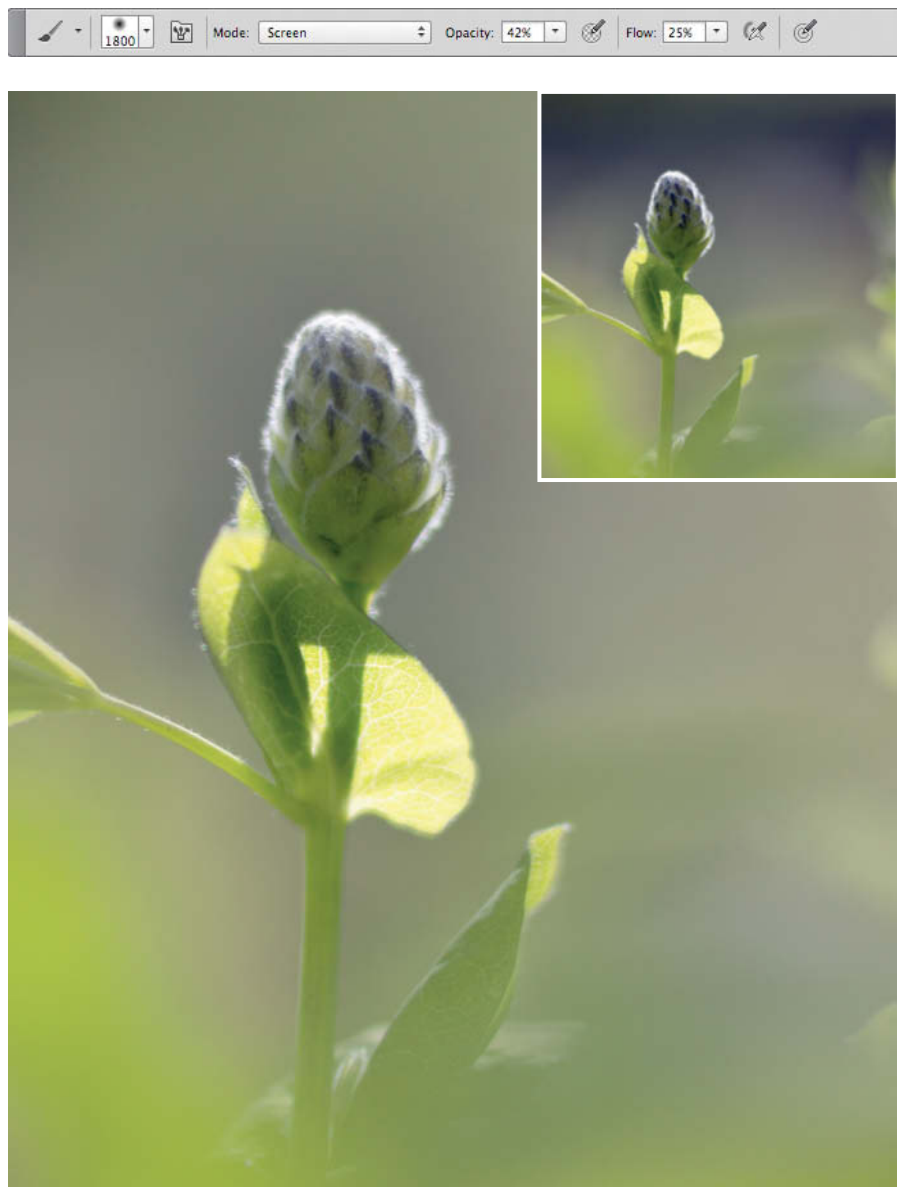
middle. The *a* channel represents the magenta/green component and the *b* channel blue/yellow. The negative values stand for the 'cooler' green and blue tones, while the positive values represent the 'warmer' magenta and yellow tones. Here, a zero value represents a neutral gray tone, the lightness of which is determined by its *L* value. Positive *a* and *b* values are brighter than neutral gray, while negative values are darker. These relationships are the 'secret' of the Lab model.

But let's get back to blending modes. The separation of lightness and tone incorporated into the Lab model makes it possible to adjust a color without affecting its brightness by applying blending modes to the *a* or *b* channels only – an approach that is simply not possible in RGB and CMYK modes, where adjustments to color always affect brightness.

## Using Calculations to Adjust Colors

In the following example, we will be using the *b* channel of an image to apply a Calculations adjustment (Image > Calculations) using one of the blending modes from the fourth group (i.e., the ones that do not change a photo's original neutral gray tone). Merging either the *a* or the *b* channel with itself intensifies the colors in the image that correspond to that channel.

There are many more color variations to be discovered if you invert the source pixels in the Calculations dialog (select the *Invert* checkbox in the Source 1 section) or blend the *L* channel in Normal mode with one of the color channels. It is easier to gain an impression of the results these types of blends will produce if you hide the channel you are not working on by clicking on the eye icon in the Channels panel. You can now blend the *L* channel into your target color channel by selecting it as your source. This converts all the image elements that are darker than neutral gray to green (if you are using the *a* channel) or blue (if you are working with *b*). Correspondingly, all the elements that are brighter than neutral gray are converted to magenta in the *a* channel and yellow in the *b* channel. All of the adjustments mentioned here can be fine-tuned by adjusting the opacity level. Using Calculations is a quick way to selectively intensify colors and is a popular method for peppering up images captured in dull weather. But remember, color data has to be present in the first place if it is to be intensified, so check the content of the



Applying a vignette with reduced opacity produces subtle effects that are quite difficult to detect but are nevertheless very effective

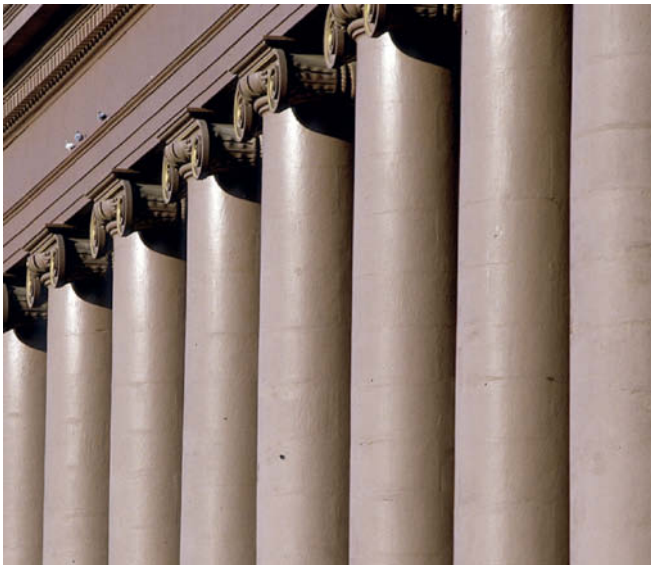
image areas you want to adjust using the Eyedropper tool in the Info panel before applying an effect.

## Adjusting Colors using Advanced Blending Options

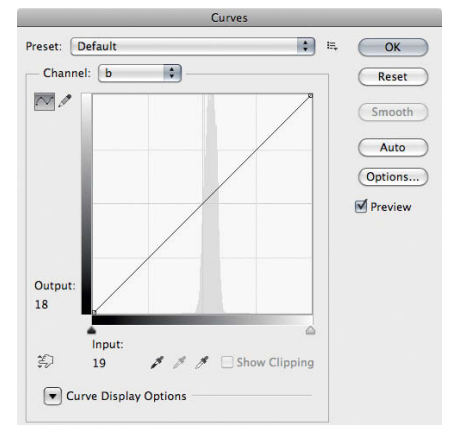
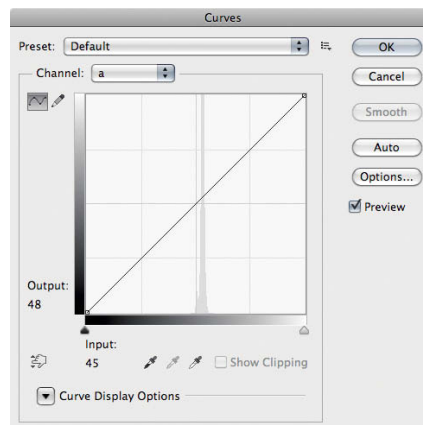
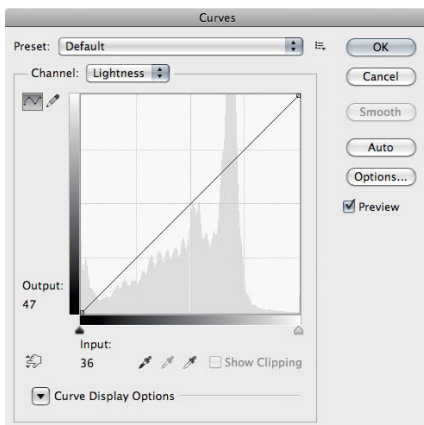
To try out this technique, first duplicate the background layer of your Lab mode image and double-click the new layer icon to open the Layer Style dialog. Then uncheck the *L* channel in the Advanced Blending section of the dialog to ensure that the blending

mode you select in the General Blending section is only applied to the two color channels. In our garage door example on page 113, we used Linear Light mode.

You can, of course, further tweak your effect by unchecking one of the color channels and/or adjusting the *Blend if* options to apply your blend effect to just part of the selected channel(s). The possibilities are virtually endless and your imagination is the only limit to what you can achieve. And by the way, you can apply the same technique in reverse to adjust the brightness of an image without affecting its colors. (pen)



The channel views for a Lab mode image are unusual if you are used to viewing RGB images. Although the *L* channel contains most of the visual information you would expect, the *a* and *b* channels do not appear to contain any visible data.

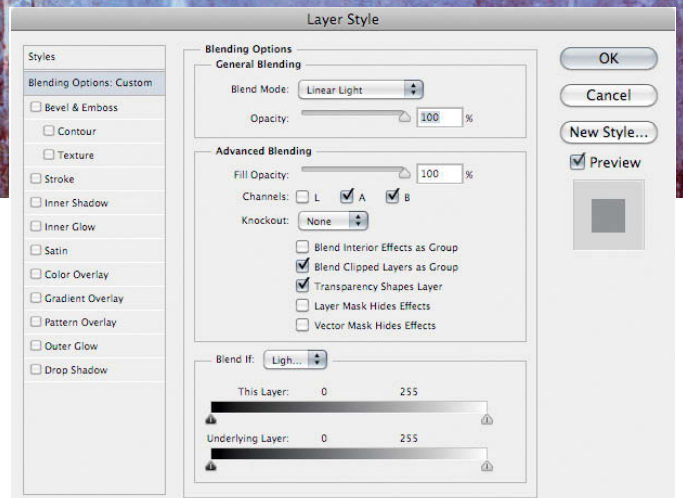


The *L* channel has values that range from 0 to 100, whereas zero is located in the middle of the color curves





With just a few clicks in the right places, you can alter the colors in a Lab-mode image without affecting brightness



Use the *Blend if* options to specify which colors remain unaffected by your changes

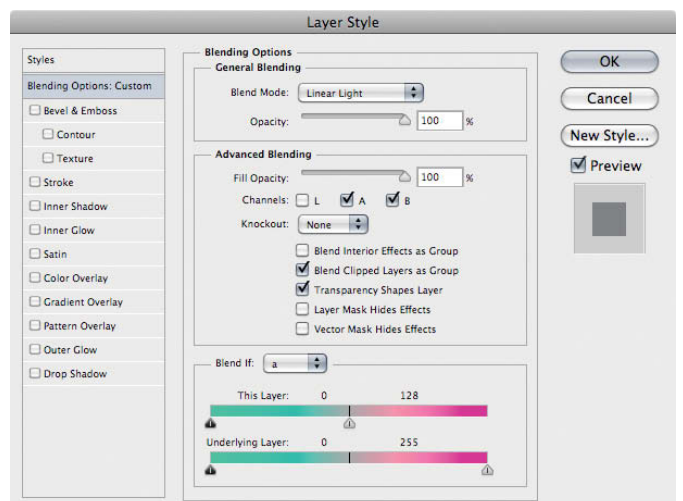




Image: quavondo (iStockphoto)

Maike Jarsetz

# Dedicated Selection Tools

Using Photoshop isn't the only way to make precision selections – there is a range of standalone and plug-in selection tools available that do the job just as well at a fraction of the cost. This article tests some of the more popular tools on the market and compares the results with those produced by Photoshop.

In Issue 8 of *c't Digital Photography*, we explained some sophisticated *Photoshop* selection techniques and promised to review some of the alternative plug-ins and standalone tools later on. This article makes good on that promise and takes a closer look at three of the better selection tools that we have come across.

All three tools are available for Windows and Mac. The techniques they employ are quite similar to those used by *Photoshop*, and are based on color ranges, edge tolerances and fine-tuning masks. The advantage of a dedicated tool is that it concentrates on doing one thing very well rather than having to integrate its functionality into a smorgasbord of other tools and tweaks the way *Photoshop* does. This means that dedicated tools are often simpler and more intuitive to use.

All of these solutions strongly emphasize the use of color ranges. While Topaz *ReMask 3* is based almost entirely on this concept, OnOne *Perfect Mask 5* and Vertus *Fluid Mask 3* combine color ranges with additional segmenting techniques to achieve precise results. Both tools allow you to directly influence the complexity of the segments they select.

While all three divide an image into foreground, background and transition zones, they use very different tools to fine-tune the results. The segment-based tools look a lot like the *Photoshop* Extract filter, which has been integrated into the Smart Radius tool since the release of CS5. The range of fine-tuning options in all the programs we tested is significantly broader than that offered by *Photoshop*.

Used as plug-ins, all of our test candidates either install automatically to *Photoshop* or ask for your target application during setup. *Fluid Mask 3* and *ReMask 3* are included in the *Photoshop* Filter menu, while *Perfect Mask 5* becomes part of the Automate command in the File menu.

But take care: *Fluid Mask 3* and *ReMask 3* delete any excess pixels from your original image file. *ReMask 3* automatically creates a copy of the background layer, and you can use the selection to generate a layer mask for the original image layer, whereas with *Fluid Mask 3*, it is a good idea to make a copy of the background layer manually before you begin making a selection. The more sophisticated OnOne solution automatically converts its selection results into a new, masked *Photoshop* layer.

## Our Test Procedure

We used a green screen image that includes various individual hairs and blurred edges as



Image: David Koos, Copyright Rebecca Straus

This is the original photo we used for our test

our test image. Selecting the background color is not particularly tricky; the real challenge lies in finding and removing the remains of the background from between the hairs and dealing with blurred transitions. Using *Photoshop* to process these types of

artifacts requires detailed knowledge of the application and a lot of time-consuming fine-tuning work. Our aim was to see just how quickly and effectively these tools tackle the same tasks and find out how good the results really are.

## Using Photoshop to Perform Our Test

The best way to start any complex selection using *Photoshop* is to apply a double blend to the green channel using the Multiply and Overlay blending modes. An additional Levels correction gives the edges of the selection (i.e., the hair ends) sufficient contrast with the background. Inverting the resulting selection gives you the basis for your layer mask, which you can then fine-tune using the Dodge and Burn tools to make individual areas more or less opaque. Use the Blur tool in Darken mode to deal with blurred transitions. The *Decontaminate Colors* option in the Refine Edge dialog isn't powerful enough to remove all the remaining background color between the hair ends, but you can get rid of it by duplicating your working layer and reducing the size of the mask to reveal the edge pixels on the layer below. Once you have done this, select either Multiply or Screen mode for the new layer

(depending on the color of the background) and use a Replace Color brush to find and replace the hair color where necessary.



A tweaked version of the green channel makes an ideal starting point for a selection mask

## » OnOne Perfect Mask 5

**How it works:** *Perfect Mask 5* combines color range techniques with complex image segmentation. You can use custom color lookup tables to fine-tune your selection, and the masks this produces can be edited directly.

**Using the program:** The currently loaded image is automatically segmented when you start the plug-in. The resulting segments can be displayed separately and help to differentiate between 'Keep' (foreground) and 'Drop' (background) zones. Use the *Scaling* option in the program's Settings dialog to define the degree of precision in the segmented view.

The first step is to use the Drop Brush tool to define sample background colors. The program then automatically deletes all the segments of the same color as the one(s) you have selected. You can alter the brush settings to make the edge definition in your selection more or less precise.

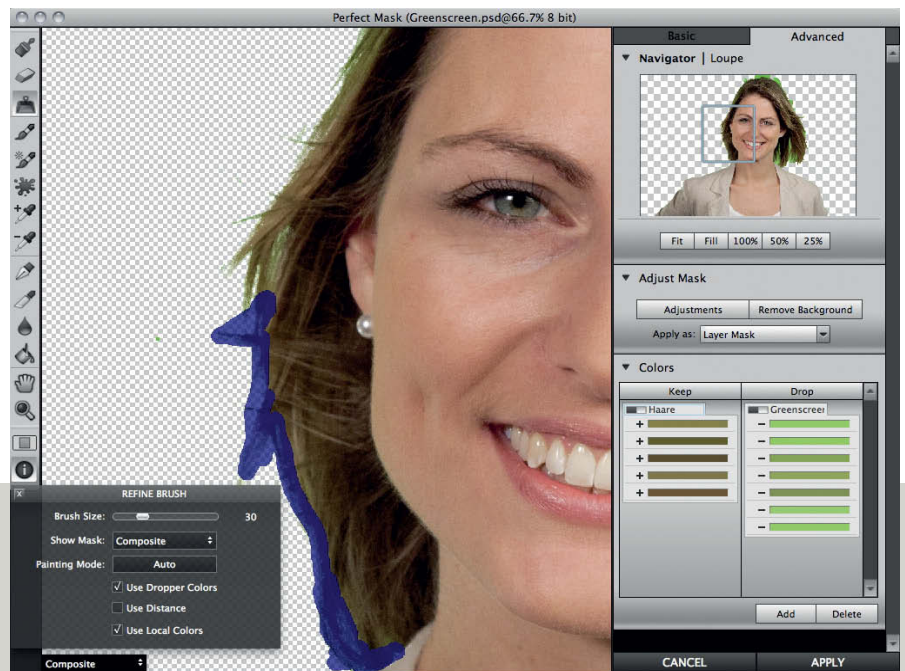
The Refine Brush function is then used to roughly define the edge of the selection, creating transparent areas in the process. The clever part of this operation is that you can define your own Keep and Drop colors using an eyedropper and save them in a custom table. To use your saved colors, make sure that you select the *Use Dropper Colors* option.

The same option is available for the Magic Brush fine-tuning tool – a kind of 'background eraser' which, when properly defined, can even be used to make precise selections of blurred transitions. The Transition slider determines the hardness of a transition, and its maximum value of 255 represents a very soft transparency effect.

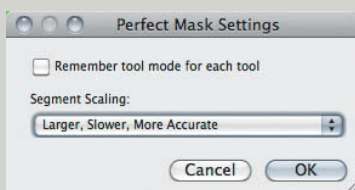
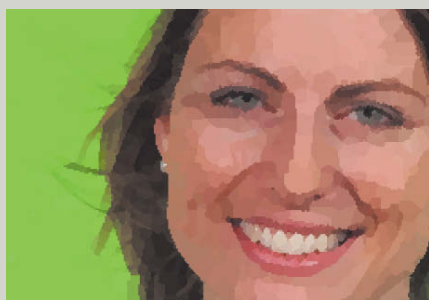
Once you have performed any fine-tuning, you can edit the mask you have produced in the Adjust Mask pane, using the Chisel tool to sharpen the selection's edge or the Blur tool to soften it. The resulting mask is then handed over to *Photoshop* as a layer mask.

**Conclusions:** *Perfect Mask 5* is a complex tool that is nevertheless simple to use. The individual functions have a good range of options and the ability to define custom color tables is really helpful. The additional mask tools make it possible to produce near-perfect masks, and the simple handover to *Photoshop* is the icing on the cake.

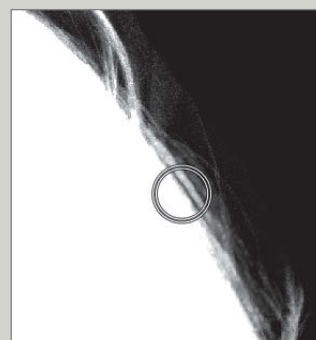
**www.ononesoftware.com**  
**Price: US\$99.95**  
**(Perfect Photo Suite 6 costs US\$299.95)**



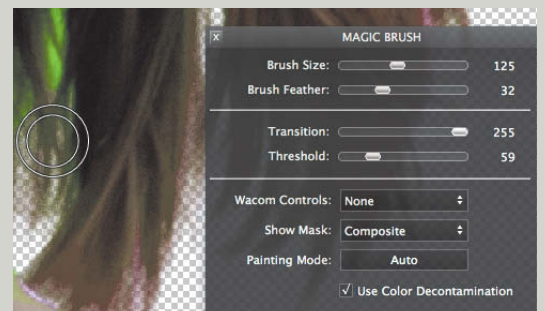
*Perfect Mask 5* hands over its comprehensive masking results directly to a new *Photoshop* layer mask



*Perfect Mask 5* allows you to display the segments that make up a selection, and offers various different segment scaling parameters



The Refine Brush tool selects the transition areas in your image



The Magic Brush tool can be used to delete unwanted background color and any remaining colored pixels from between the hair ends

## » Topaz ReMask 3

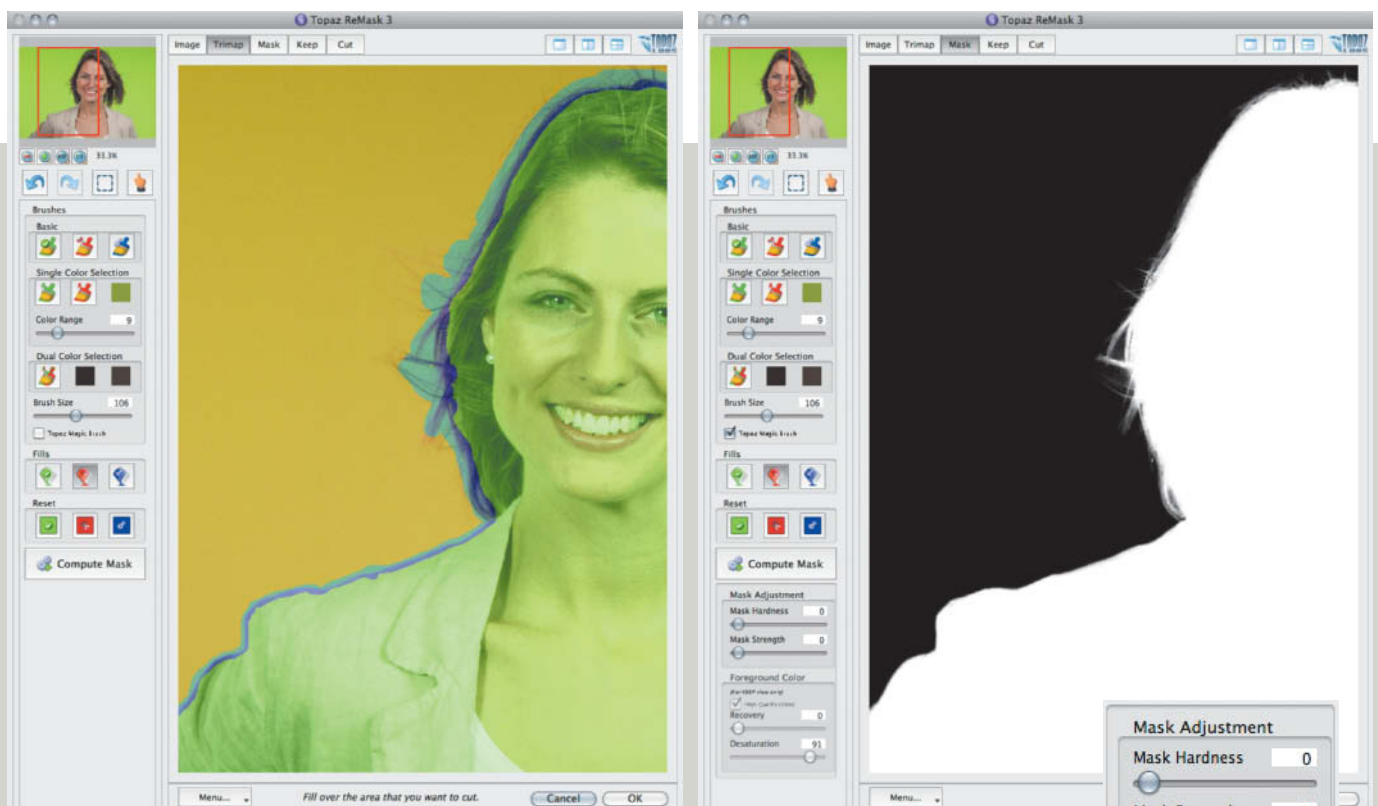
**How it works:** *ReMask 3* offers a set of tools that select and delete pixels based exclusively on color range techniques.

**Using the program:** This plug-in dives straight in and presents you with three Basic Brush tools for marking the areas that you wish to use for your transition and defining 'keep' (foreground) and 'cut' (background) areas. Clicking the 'Compute Mask' button performs the selection you have defined.

Having made your basic selection, you can now fine-tune the results. There are various brush tools available for making global and local adjustments to the edges of the mask, all of which are based on color range selection techniques. The Single Color Selection brush can be used to remove a single color on either side of the mask's edge, while the Dual Color Selection brush enables you to select background and foreground colors between which you can then add a transparent transition area.

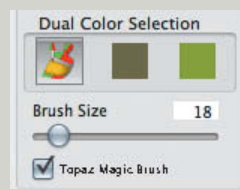
**Conclusions:** The plug-in is simple and intuitive to use. The Dual-Color Selection Brush quickly proved to be the best all-round tool for performing tricky selections.

[www.topazlabs.com](http://www.topazlabs.com)  
Price: US\$69.99



*ReMask 3* creates a 'compute' zone between the 'cut' and 'keep' areas, which you can then fine-tune to suit your own particular needs

You can individually adjust the mask's hardness and strength (i.e., contrast)



The Dual Color Selection Brush is specially designed for use with complex transitions. You have to select the colors you want it to adjust before applying it.

## » Vertus Fluid Mask 3

**How it works:** Vertus *Fluid Mask 3* uses a complex segmentation algorithm that can be adjusted to suit various different types of images areas. Individual segments can be fine-tuned using different parameters and color range tools.

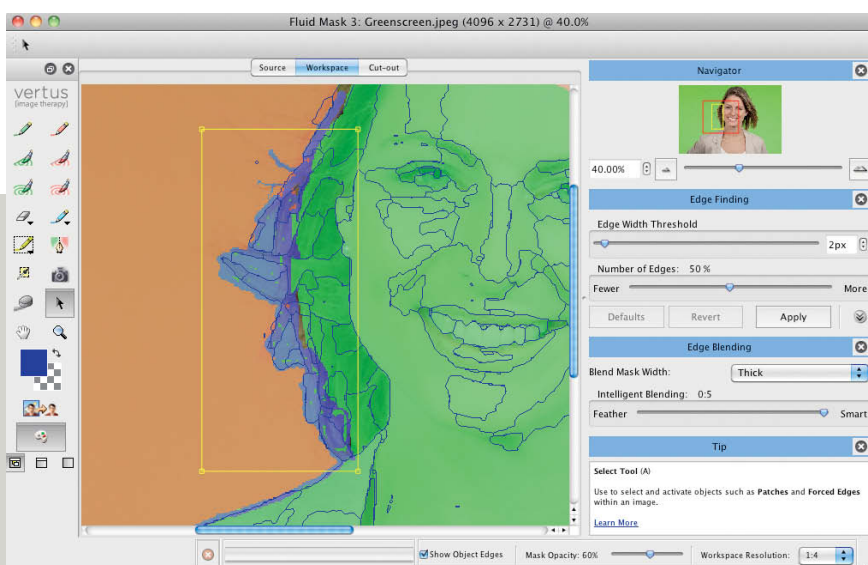
**Using the program:** *Fluid Mask 3* starts by segmenting the image and displaying a set of segment outlines that can be quite confusing at first glance. The segments can

be divided into Blend, Keep and Delete areas using local and global brushes as fill and extraction tools. Once you have created an initial selection using the 'Create Cut-out' button, you can fine-tune any transitions that your initial settings haven't implemented properly. Select areas where you want to adjust the transitions using the Rectangle Patch or Patch Brush tool. You can then use the Preview Cut-Out tool to review your changes.

There is a multitude of fine-tuning options available. You can analyze and adjust the degree of segmentation separately for a selected area and use the color Workspace dialog to allocate individual tones to the Blend, Keep and Delete masks. The edge blending settings have their own Intelligent Blending and Edge Smoothing sliders for adjusting the degree of sharpness/softness you wish the transitions to have, and the additional *Complex Hair Blending* option even enables you to compare the color ranges of the Delete and Keep areas, making it possible to make precise selections within extremely complex transitions.

But be warned: *Complex Hair Blending* uses a lot of processing power, so it is a good idea to save your project before applying it, just in case it overtaxes your system. Once you are happy with your results, you can hand over the finished mask to *Photoshop* using the Save and Apply command in the File menu.

**Conclusions:** *Fluid Mask 3* seems clunky and complicated at first, and isn't nearly as intuitive to use as the other programs we tested. However, once you get the hang of using it, it delivers very good results, especially for details that can otherwise be tricky to deal with.



*Fluid Mask 3's* approach to segmentation takes a little getting used to but rewards you with excellent results if you are prepared to spend some time learning how to use it effectively



The *Complex Hair Blending* option is highly customizable but uses a lot of processing power

[www.vertustech.com](http://www.vertustech.com)  
Price: US\$149.00

## Conclusion

These tools offer varying degrees of complexity and intuitiveness. *Fluid Mask 3* is the most complicated to master, but rewards patient users with excellent results. *ReMask 3* is very simple to use, but requires a lot of time-consuming fine-tuning once a basic selection has been made. *Perfect Mask 5* is just as intuitive to use and, once you find out how to use its advanced settings, extremely effective. The Adjust Mask pane is very similar to the *Photoshop* Masks panel, giving experienced *Photoshop* users a useful head start. (pen) **ct**

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Dmitri Popov

## Budget RAW Processing with **Photivo**

High-end RAW processing tools such as Adobe Lightroom and Apple Aperture are popular among photographers, but are not particularly cheap. Fortunately, there is a growing range of free open source RAW processing tools available that includes Photivo. This is a relatively new application built by a small group of developers, but offers all the essential features you need for your everyday RAW processing needs.



Shooting in RAW puts you fully in charge of the digital image editing process, which is why many amateur and professional photographers prefer working with raw sensor data rather than JPEG files. However, the quality of the results you produce depends not only on your personal levels of skill and experience, but also on the software you use.

In addition to *Photivo*, *RawTherapee* is another popular open source RAW processor that has been available with an open source license for a while now (both are included on this issue's free DVD). Although *Photivo* has a user-friendly interface, it doesn't shield the user from the complexities of its tools and features the way *RawTherapee* does, so mastering *Photivo* requires some time and effort. (For more details, see our article on *RawTherapee* in Issue 7 of *c't Digital Photography*.) This is not necessarily a disadvantage, and learning to use the program is a great way to get to know the theory and basic principles of RAW image processing and retouching. The lack of proper documentation doesn't make the learning process any easier, but if you are willing to spend time learning *Photivo's* tools, you will be able to achieve impressive results within a relatively short space of time. *Photivo* is a pure RAW processor and lacks tools for sorting and organizing photos. It is basically designed as a tool for optimizing individual images and, as such, is better suited to use as a companion application rather than an end-to-end photo workflow. The fact that both *Photivo* and *RawTherapee* are available free of charge makes the question of which application is 'better' largely irrelevant. There is no better way to find out which solution meets your needs best than to try out both applications for yourself.

*Photivo* supports various common demosaicing algorithms, including bilinear, VNG, VNG4, PPG, AHD, VCD, LMMSE and others. The application includes a large collection of processing tools, from lens distortion and vignetting correction features to a variety of different denoising and sharpening tools and also includes a handful of creative tools and filters, such as film grain simulation, black and white conversion, cross-processing, split-toning, vignetting, soft glow and tilt/shift, to name just a few.

*Photivo* integrates well with the GIMP open source photo processing package, which means that you can use it as part of a complete, free digital photographic workflow. It is available for Windows (32 and 64-bit), Linux and Mac OS X, and the application is localized to several languages, including German, French, Russian, Italian and Dutch. In

short, *Photivo* is an extremely attractive RAW processing application, so before you spend money on a commercial solution, it is well worth giving it a try.

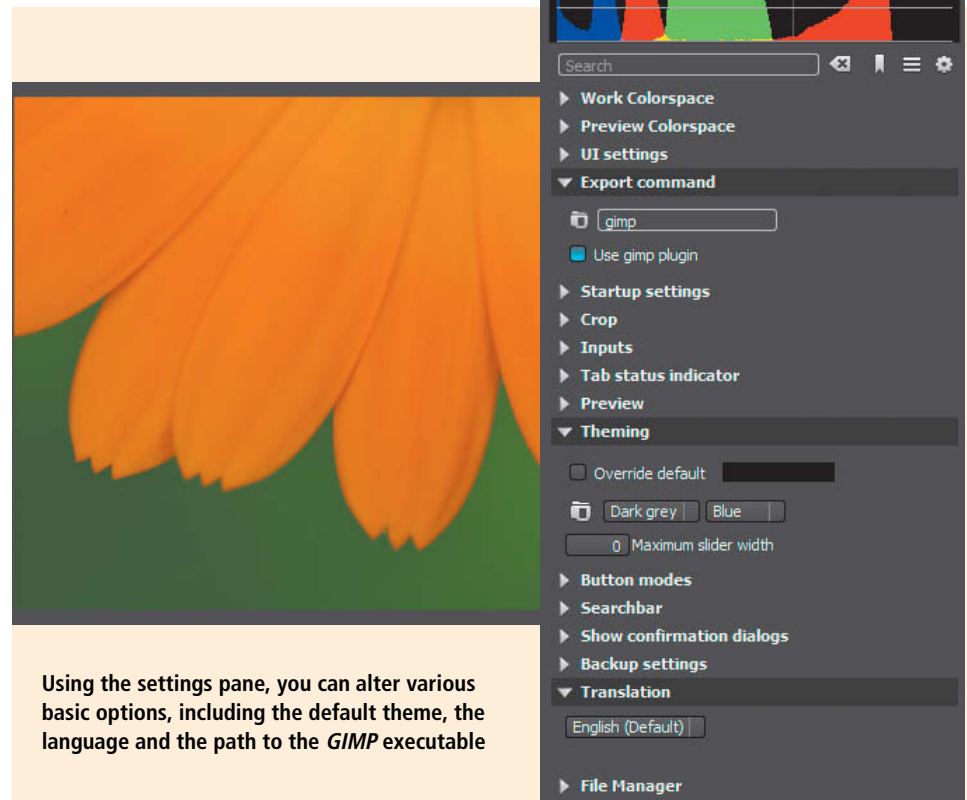
## Installation and Configuration

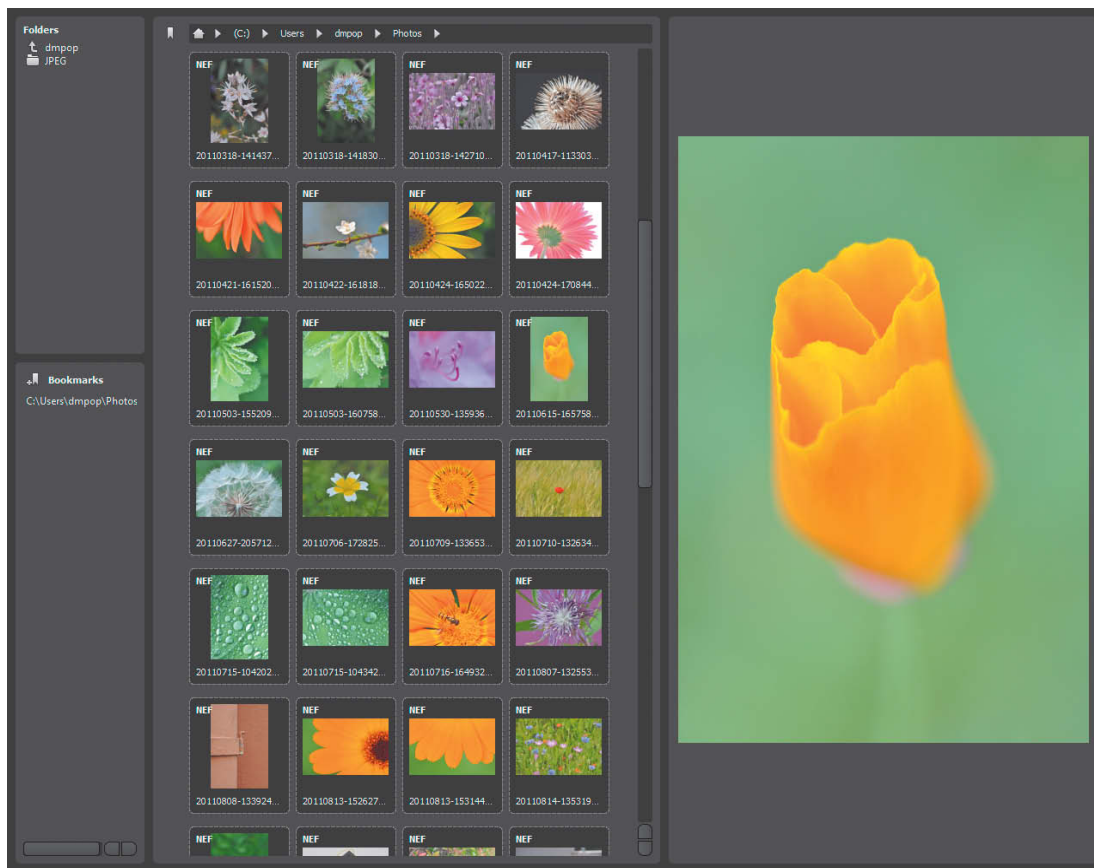
Thanks to the precompiled installer packages available at the *Photivo* website, installing the application in Windows is a straightforward procedure. Simply download the setup package for your specific architecture (32 or 64-bit) and run the installer, but bear in mind that the 64-bit version only runs on Windows 7, so if you are using 64-bit version of Windows XP or Vista, you should use the 32-bit version of the application. You can also turn *Photivo* into a portable application that you can run off a USB stick or external hard drive, allowing you to process RAW files even when you are away from your main machine. To make *Photivo* portable, copy the entire program folder from the C:\Program\Files directory to your USB stick. Create an empty text file and save it as *use-portable-profile* (without a file extension) in the *Photivo* folder

on the USB key. And that's it – you can now run *Photivo* from your USB stick in portable mode.

*Photivo* is first and foremost a RAW processing tool, so you need a dedicated photo retouching application for post-processing work. If you use *GIMP* as your preferred photo editing tool, you will be pleased to hear that you can integrate the two using the *Photivo to GIMP* plug-in. This module enables you to hand over the currently open file from *Photivo* to *GIMP* while preserving the original Exif metadata and output color profile. To install the plug-in in Windows, download it from [photivo.org](http://photivo.org), unpack the downloaded archive and move the *ptGimp.exe* and *QtCore4.dll* files to the C:\Users\USERNAME\gimp-2.x\plug-ins\ folder.

Before you start using *Photivo*, you will need to configure a couple of basic settings. Click the 'Photivo Settings' button to switch to the settings pane, where you will find an expandable list of configuration options. To complete *GIMP* integration, switch to the **Export command** section, and tick the *Use gimp plugin* check box. Specify the path to





Photivo's built-in browser gives you access to RAW files stored on local and external storage devices, and lets you bookmark frequently used directories for faster access

the `gimp-2.x.exe` file in the field above the check box (by default, the path is `C:\Program Files\GIMP-2.x\bin`). *Photivo* uses English as its default language, but you can switch to any of its other supported languages in the **Translation** section of the settings pane. If the default skin is not your cup of tea, you can reconfigure it in the **Theming** section. There are other options you can tweak too, but it's best to leave these at their default values for now.

## Working with Photivo

Once you have configured the program, it's time to get to grips with the application's basic operations. When you launch *Photivo*, it automatically opens the built-in file browser, which accesses local and external

storage devices. The file browser interface is split into three parts: the left-hand sidebar shows the hierarchical folder structure, the middle pane displays thumbnails of photos in the currently selected folder and the right-hand pane displays a preview of the selected RAW file. The browser enables you to bookmark frequently used folders and access them with a single mouse click. To bookmark the current folder, press the 'Add Bookmark' button in the Bookmarks section of the left-hand pane or use the `Ctrl+B` keyboard shortcut. Double-clicking a file opens it for editing.

Although *Photivo* offers a wide selection of tools, its interface is designed to be as unobtrusive as possible. The application window is split into two main areas: the image area and the tool pane. The latter is organized in several tabs, with names like Camera, Geometry, RGB, Lab Color/Contrast, Lab Sharpen/Noise etc. Each tab represents a separate processing stage for the currently selected RAW image file, and the general assumption is that you start processing in the Camera tab and work your way through the others until processing is complete. The sheer number of tools offered by the program can be overwhelming, but the

built-in search feature enables you to quickly locate the tool you need. Simply type the name of the tool you want in the Search field located below the histogram pane – the application will then automatically display a list of matching results.

In addition to the Search feature, you can also mark tools that you use regularly as favorites. To do this, right-click a tool and select the *Add to favorites* option from the context menu. You can then use the 'Favorite tools' button to choose from the list of tools you use most. Similarly, you can also hide tools that you use rarely by right-clicking them and selecting the *Hide* option from the context menu. Press the **H** key to view a list of all hidden tools or the **U** key to unhide all tools in the current tab.

There are several other actions available in the tool context menus. The **Save preset** action allows you to save a tool's current settings for later use, while the **Append preset** action writes the current tool settings to an existing preset file. This action enables you to save the settings of multiple tools in a single preset. To apply an existing preset to the current photo, switch to the **Input** section of the Camera tab, press the 'Open preset' button and select the preset file you want to

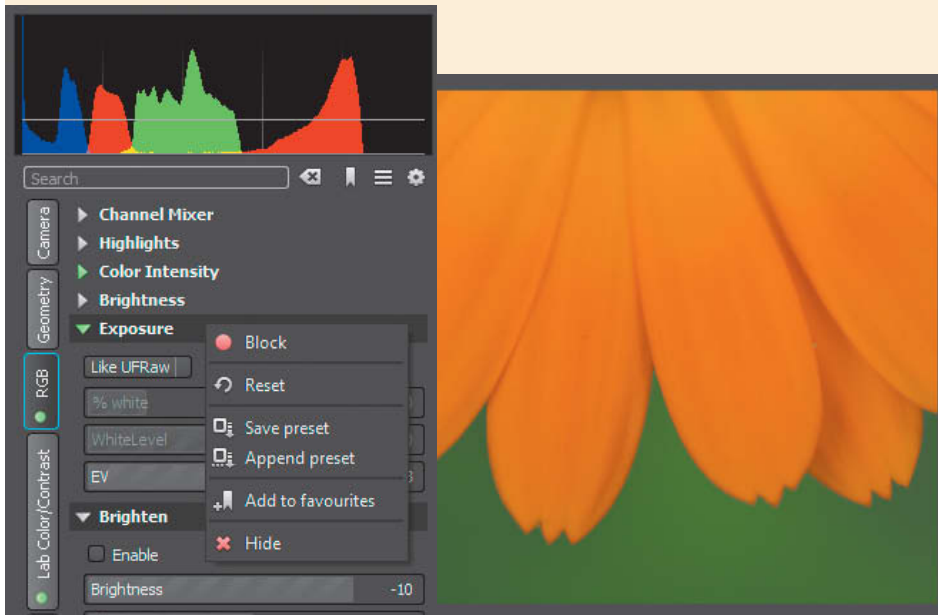
apply. The **Block** action lets you temporarily disable a specific tool without affecting its settings, allowing you to exclude certain operations when processing an image. Finally, the **Reset** action restores the tool's settings to its default values.

Photivo provides helpful visual clues to help you identify which tools are enabled in the current processing session. A green dot on a tab means that at least one tool on that tab is currently active. Colors are also used to indicate the status of each tool: a green arrow means that the tool is active, while a red one means that the tool is blocked. You can use the 'Active tools' button to quickly access all active tools.

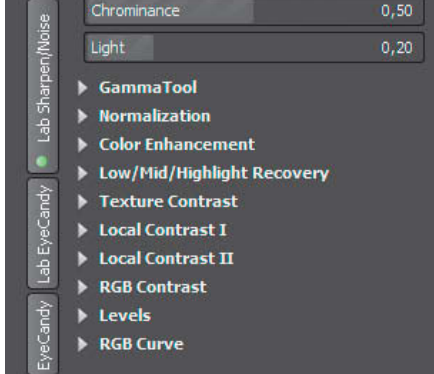
The image area is the other key part of the application's interface. This contains the current rendering of the photo you are working on, also known as a 'pipe'. By default, the size of a pipe is one quarter of the size of the original RAW file, which ensures speedy processing and fast preview updates when changes are applied. You can adjust the size of the pipe using the drop-down list at the bottom of the tool pane, and Photivo cleverly allows you to export either the current pipe or a full-size pipe at the same size as the original RAW file. This approach provides you with faster RAW development and efficient utilization of hardware resources while still allowing you to export processed images at full size. The only limitations to this feature apply to the Liquid Rescale tool and most of the sharpening filters. The effect these tools produce depends on the pipe size, so applying them to a quarter-size pipe and then exporting a full-size image can lead to unexpected results.

The zoom bar at the bottom of the image pane contains buttons for zooming in and out of the preview image, but you can also zoom using the scroll wheel on your mouse or the **0** to **4** keys. Right-clicking the preview image gives you access to more useful options. For example, the Mode command lets you switch between several display modes that are designed to help you analyze your image. These include the standard RGB mode, which gives you a realistic rendering; Structure mode, which provides an overview of detail distribution within the image; and Gradient mode, which shows the luminance gradient that represents the edge detail in the image. L\*, a\* and b\* modes display the luminance and color channels that correspond to those in the L\*a\*b\* color space.

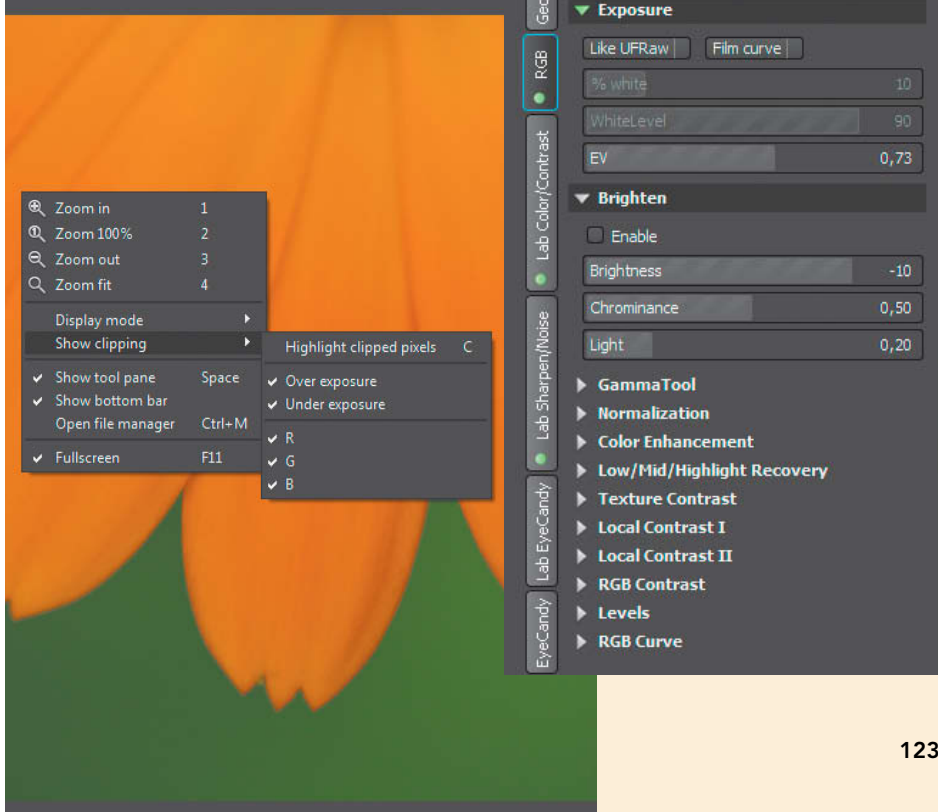
The commands contained in the Clipping sub-menu enable previews of under- and overexposed image areas. To activate this feature, select the Indicate command and enable the *Overexposure* and *Underexposure*

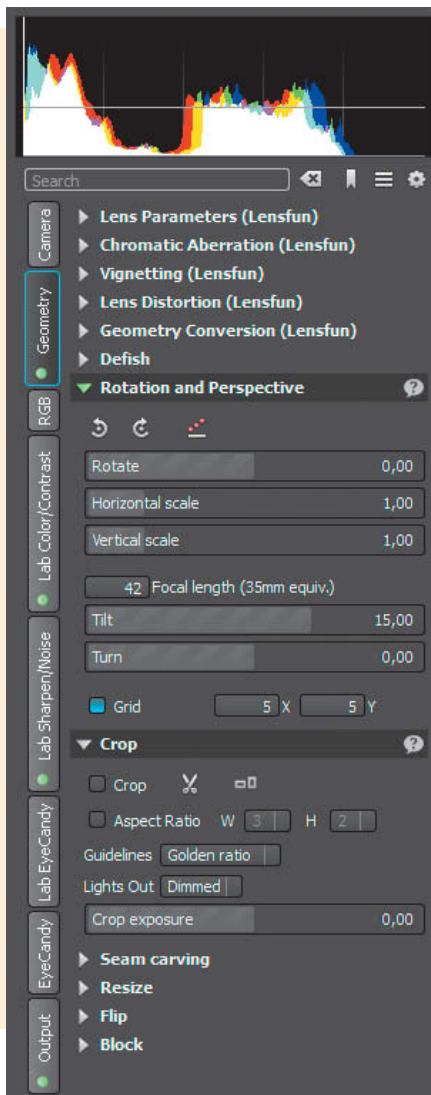


Right-clicking a tool accesses various useful actions, allowing you to save the tool's settings as a preset, hide or block a tool and reset it to its default values



Right-click on the preview image to access the Mode and Clipping image analysis options





The tools in the Geometry tab can be used to rotate and crop images as well as adjust perspective

options. You can also view under- and overexposure information for the individual RGB channels by enabling the *R*, *G*, and *B* options.

## Processing RAW Files with Photivo

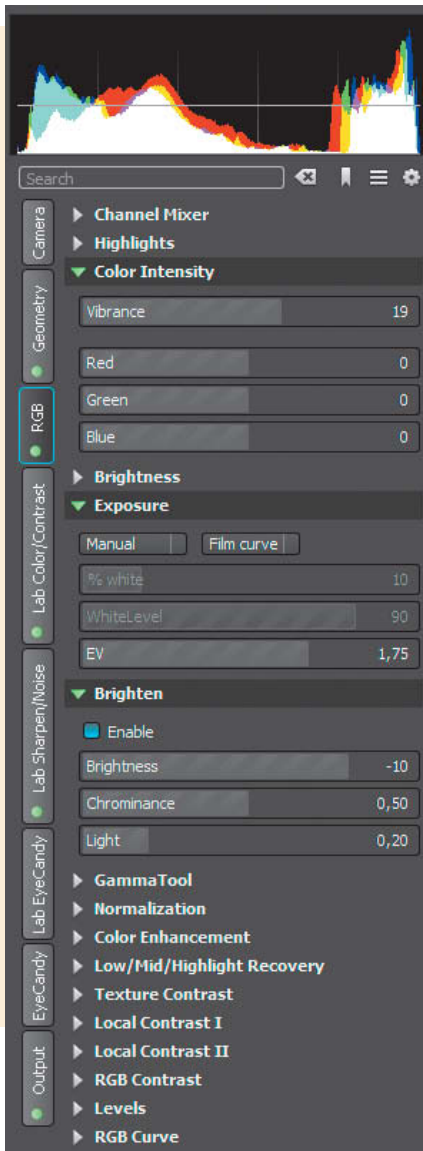
*Photivo* supports non-destructive editing, so you can experiment with as many tools and effects as you like without altering your original image data. During export, the application saves all changes made during your current processing session to a separate .pts file, enabling you to re-apply the same actions to multiple files. To apply a session's actions, open a RAW file, switch to the Camera tab, click the 'Open settings file' button, and select one of your saved .pst files. You can also save the current settings state at any time by

right-clicking the 'Save current pipe' button and selecting the *Save settings* option.

Now we've covered the basics, let's put *Photivo* to use and process a sample photo – in this case, one of the Hanazono shrine in Shinjuku, Tokyo. Although this is probably not the world's best photo of the shrine, it has several obvious issues which make it a perfect candidate for tweaking. You can download the image file from <https://s3-eu-west-1.amazonaws.com/dmipop/20110904-111124-10632.NEF> and reproduce the actions described here on your own computer. Open the downloaded RAW file and switch to the Camera tab. The first thing you have to do is choose the correct color profile. To do this, expand the **Camera color space** section, select the *External Profile* option from the drop-down list and pick the appropriate color profile (in this case, *NIKON\_D5000.icc*) using the 'Load

a camera profile' button. If *Photivo* doesn't offer a color profile for your specific camera model, you can use one of the default profiles. Leave the *Intent* and *Gamma* drop-down options at their default values.

The next steps involve straightening the image, adjusting its perspective and cropping the results. Switch to the Geometry tab, expand the **Rotation and Perspective** section and use the mouse to move the Rotate slider to the left to straighten the photo. Instead of using the slider, you can also right-click the currently displayed value and enter a custom value manually (in the case of our sample image, this needs to be about -0.5). Press the **Enter** key to apply the change. Enabling the *Grid* option makes it easier to align images accurately. To fix perspective in our sample image, tilt the photo forward by using a Tilt value of 15. Once you've done that, crop the image using the



Alongside its other options, the RGB tab contains tools for adjusting exposure, brightness and color vibrancy

tools in the **Crop** section. Enable the *Crop* option and, if necessary, enable the *Aspect Ratio* option and specify your desired values. You can then use your mouse to define a crop area within the image. Press the 'Confirm crop' button to apply your selected settings.

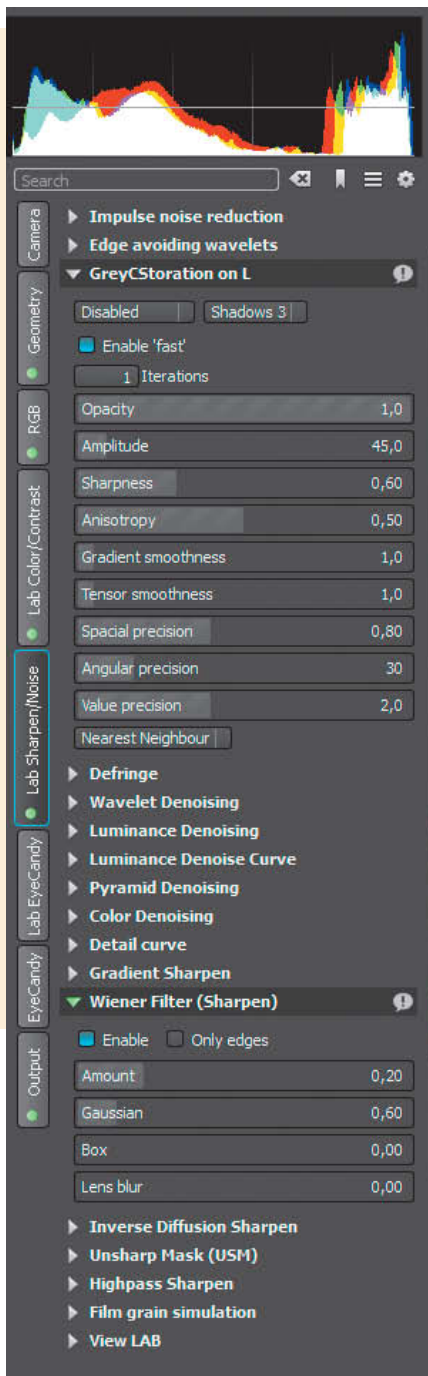
Next stop is the **RGB** section, which contains tools for adjusting exposure, brightness and color. By default, *Photivo* uses the Like UFRaw automatic exposure mode, which often produces underexposed results. However, you can easily work around this issue by adjusting exposure manually. In the **Exposure** section, select *Manual* from the list of exposure mode options and adjust the EV value appropriately. Next, expand the **Brighten** section, activate the *Enable* option and adjust the Brightness slider to taste. To make the colors more vibrant, use the Vibrance slider in the **Color Intensity** section.

Our sample image could also use some sharpening, so the next place to head is the **Lab Sharpen/Denoise** section. *Photivo* offers several sharpening tools but uses the Wiener filter by default. This filter produces excellent results with a minimum of tweaking, so try it first before exploring other tools. *Photivo* doesn't skimp on denoising features either, and includes the powerful but easy-to-use GreyCStoration tool. Although this tool offers a multitude of user-adjustable parameters, you can usually achieve great results by using the default values and experimenting with different shadow masks.

Increasing exposure values and brightening an image may well produce overblown sky areas as a result. For situations like this, *Photivo* has the Gradual Overlay tool tucked away in the EyeCandy tab. This tool emulates a graduated neutral density filter,

which is an analog tool often used to properly expose bright skies. To apply the filter, switch to the EyeCandy tab, expand the **Gradual overlay I** section and select *SoftLight* from the Mode drop-down list. You can then tweak the available parameters until you find the effect you are looking for. Enabling the **Gradual overlay II** section gives you options for adding a color hue to the filter. The EyeCandy tab also contains a handful of other creative tools, including Black and White conversion and the Cross Processing tool with its various cross process emulations. The tab also includes Texture Overlay and Vignette tools.

Once you are happy with the changes you have made, it is time to export the finished image. Before you actually export a file, you have to configure the export settings in the **Output Parameters** section of the Output tab. Here, you can specify the desired format



Photivo boasts a wide range of denoising and sharpening tools. By default, the application uses the Wiener sharpening filter, which produces good results with a minimum of tweaking.

(PPM, JPEG, PNG or TIFF) as well as the title, tags and rating. Finally, right-click the 'Save current pipe' button and select the *Save full size* option to export the full-size photo. If you want to hand over an image to GIMP for further processing, right-click the 'Send image to external editor' button and select either the *current* or *full-size pipe* option.

### Batch Mode

Photivo includes a batch mode which allows you to automatically process multiple RAW files

in a single session. Although batch mode isn't particularly intuitive to use, it is nevertheless fairly straightforward. Start by opening a RAW file and making your desired changes, then right-click the 'Save current pipe' button and choose the *Save job file* command. Select the RAW files you want to include in the batch job, specify an output folder and save the job file. In Windows, launch the command prompt and execute the following command, replacing the sample values with the actual paths to the *Photivo* executable and the .ptj job file:

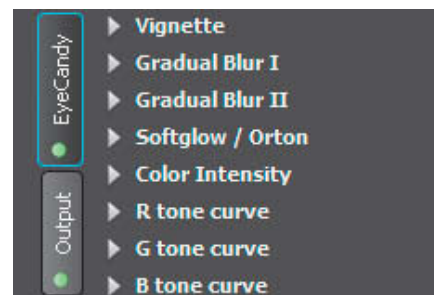
```
C:\Program Files\Photivo\photivo.exe
-j C:\path\to\jobfile.ptj
```

Please note that *Photivo* doesn't provide any output during batch operations, so you have to keep the command prompt open until the job has been completed.

### Conclusion

This article covers just a few of *Photivo's* many capabilities, and the application offers a myriad of other tools and features which can

help you get the most out of your RAW images. Although there is no real documentation to speak of, the program's non-destructive processing approach makes it easy to explore the available tools and functions without running the risk of damaging your precious image data. (jr)



The EyeCandy tab offers several creative filters to help you enhance and enliven the look of your images



# Book Review

## All for Dance

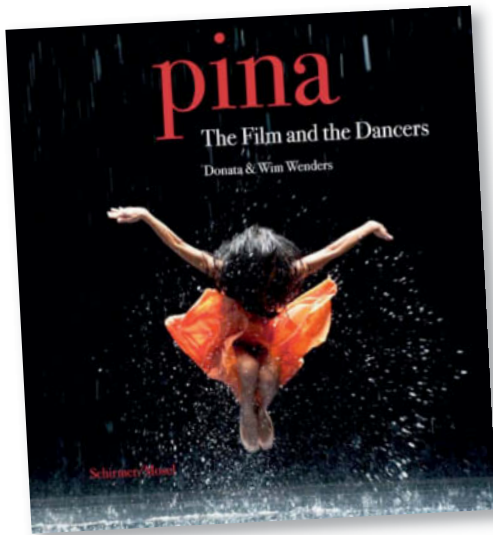
### Pina – The Film and the Dancers

Using static images to capture movement and convey its significance has always been extremely difficult to achieve using the photographic medium, and this book faces a double challenge in that it is the companion piece to a 3D film that many critics believe set new milestones in the documentation of dance. This direct comparison really emphasizes the fact that photos lack not only a temporal but also a spatial dimension.

That *Pina – The Film and the Dancers* successfully resolves this paradox to stand in its own right alongside the stage performances and the film is due in no small measure to the brilliance of its subject. Pina Bausch, the dance theater luminary who died in 2009, had a reputation for works of extraordinary intensity and for a tireless search for ways to express human experience. And, wherever there is a serious quest for authentic experience, good photographic opportunities are never far away. Donata Wenders, who was on set with her own camera during filming, shot these articulate photos with a sensitive appreciation of the

dancers and their work. Like the film, the book portrays performances both on stage and outdoors. Some were taken in urban settings, usually with only one or two dancers as their central theme, and the interesting thing is that although their costumes make them look out of place, the way they express themselves makes them seem an entirely natural part of the scene. In fact, individuals are key to the essence of the book, and the dancers' own statements that are paired with the photos play an important role. Their words often provide surprisingly profound insights into how Pina Bausch worked.

The images, together with the accompanying text by Wim Wenders and the words of the dancers, are accessible even to readers who are not immersed in the world of dance. The dancers' presence, thoughtfully observed by Donata Wenders, and the energy of the choreography and stage design, which are simultaneously intense and subversive, will touch all but the most disinterested of readers. (Robert Seetzen/tho)




#### **Pina – The Film and the Dancers**

Donata and Wim Wenders  
Published by Schirmer/Mosel  
264 pages, 153 illustrations  
10.6 × 9.8 inches  
US\$65.00  
ISBN 978-3-8296-0623-3

Pina Bausch used a great variety of materials in her productions, including real water fights and ankle-high grass



Photo: Donata Wenders, Schirmer/Mosel, 2012



## Expert in Your Field

If photography is your passion, a blog can be a great tool for reaching other like-minded users and interacting with them. If you run your own photography business, you can use a blog to keep your clients and followers in the loop and communicate with them in a direct, personal manner. Since many popular blog engines can be configured to display photo collections in a visually appealing way, you can even use a blog to completely replace a dedicated portfolio.



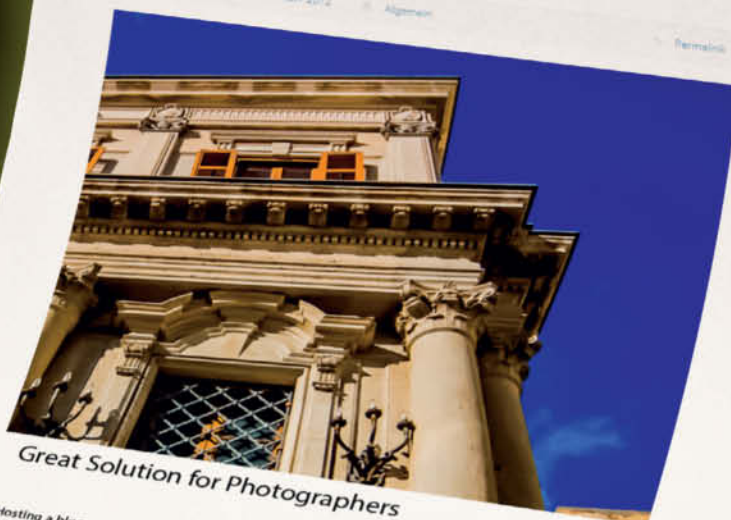
## Showcasing Your Photographic Work

As a photographer, you can put a blog to a variety of practical uses – the format is suitable for adding narrative and cultural context to photos or explaining the photographic decisions you made when you took a particular shot. If you travel a lot, you can use a blog to share your travel experiences along with shots that might not make it into your portfolio but give your readers a good impression of the place you are visiting.



## Powerful Open Source Blogging Engine

While there are many high-quality blogging applications out there, you can't go wrong with WordPress. This powerful and flexible open source blogging engine is equally suitable for maintaining a simple single-user personal blog or a complex multi-user publishing solution. WordPress has a gentle learning curve, so even if you have no experience of maintaining a blog, you should be able to master the basics fairly quickly.



## Great Solution for Photographers

Hosting a blog with WordPress.com is a great solution for photographers who don't want to get involved with installing and maintaining WordPress and dealing with system administration tasks on a daily basis. Hosting a blog at WordPress.com means that you don't have to worry about security fixes, updates, bandwidth costs and the like.



Dmitri Popov

# WordPress for Photographers

Whether pro or hobbyist, these days most photographers end up presenting their photos online in one form or another. Designing your own portfolio website takes time and effort, and also costs money, so many photographers use ready-made websites like Flickr, SmugMug and 500px. A photoblog is an elegant and economical alternative way to exhibit your work, and also gives you the opportunity to exchange news and views or explain your work to your followers. Using WordPress.com and custom plug-ins designed specifically for photographers, even beginners can quickly get their own blog up and running.

When it comes to establishing a web presence, photographers have a wealth of options at their disposal. Amateurs and enthusiasts often choose to join one of many photo sharing services like Flickr, SmugMug and 500px. These services provide a wide range of tools and features that make it easy to publish photos, interact with other users and even make some money by selling an image or two. However, many professional photographers still opt for maintaining a dedicated portfolio as part of their website. Building an individual portfolio with a unique design and style is a serious and often expensive undertaking, but for many photographers it's worth the trouble, as it provides a good way to showcase their work and attract potential customers.

Now, there is yet another option available to enthusiast photographers and seasoned professionals alike. Instead of relying on third-party photo sharing services or investing time and money in a custom portfolio, you can choose the blog format for showcasing your photographic work. As a photographer, you can put a blog to a variety of practical uses – the format is suitable for adding narrative and cultural context to photos or explaining the photographic decisions you made when you took a particular shot. If you travel a lot, you can use a blog to share your travel experiences along with shots that might not make it into your portfolio but give your readers a good impression of the place you are visiting. As a seasoned photographer, you may have some

tricks and tips that you want to share with a wider audience, and a blog provides a platform for that too. You can also use it to publish tutorials covering your favorite photo processing software, review photographic gear, post the latest photo news or cover other photography-related topics. Sharing knowledge is a good way to establish yourself not only as a competent photographer but also as an expert in your field. If photography is your passion, a blog can be a great tool for reaching other like-minded users and interacting with them. If you run your own photography business, you can use a blog to keep your clients and followers in the loop and communicate with them in a direct, personal manner. Since many popular blog engines can be

**Alfie Goodrich | Photographer**

About  
Contact  
Photography Lessons

**Commercial Photography**  
Portraits  
Fashion  
Wedding  
Pre-Wedding  
Children's portraits

**Japan Photo Features**  
Ghosts in Ginza  
Umbrellas of Japan  
Tsukiji Fish Market  
Railways of Japan  
Mount Fuji  
Cherry Blossom  
Tokyo Taxi

**Some Recent Work**  
Client Showcase: YC&AC  
Client Showcase: Zumi Zushi  
Magazine Work  
Client Showcase: PrixPrix

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Photo: Alfie Goodrich | www.alfiegoodrich.com  
Photo: Yumi Zushi | www.kurajapan.com  
© CC-BY - Shingong | www.shingong.jp

Lifestyle shoot with Vibram FiveFingers for PrixPrix



Location fashion photography for PrixPrix



Studio fashion for PrixPrix

Instead of using it as a simple blog, photographer Alfie Goodrich uses *WordPress* to present his online portfolio

configured to display photo collections in a visually appealing way, you can even use a blog to completely replace a dedicated portfolio.

While there are many high-quality blogging applications out there, you can't go wrong with *WordPress*. This powerful and flexible open source blogging engine is equally suitable for maintaining a simple single-user personal blog or a complex multi-user publishing solution. *WordPress* has a gentle learning curve, so even if you have no experience of maintaining a blog, you should be able to master the basics fairly quickly. The engine's default functionality can be extended using plug-ins, and the official plug-in repository contains a large selection of modules which can be used to add all sorts of features to a blog, some of which cater specifically for photographers. Thanks to its support for custom themes, you can give your *WordPress* blog a unique look, and there are dozens of individual designers and companies that offer ready-made themes for you to use (see the table on page 136).

*WordPress* is available with a range of hosting options to suit most budgets and levels of technical expertise. If your technical chops are up to scratch, you can deploy *WordPress* on your own server, giving you maximum flexibility at zero cost. As an alternative, you can opt for a web hosting service that has all the required components. In fact, some web hosting providers offer *WordPress* as part of a service plan, allowing you to deploy blogging software in a matter of minutes.

Running *WordPress* on your own server or a hosting service gives you full control, but

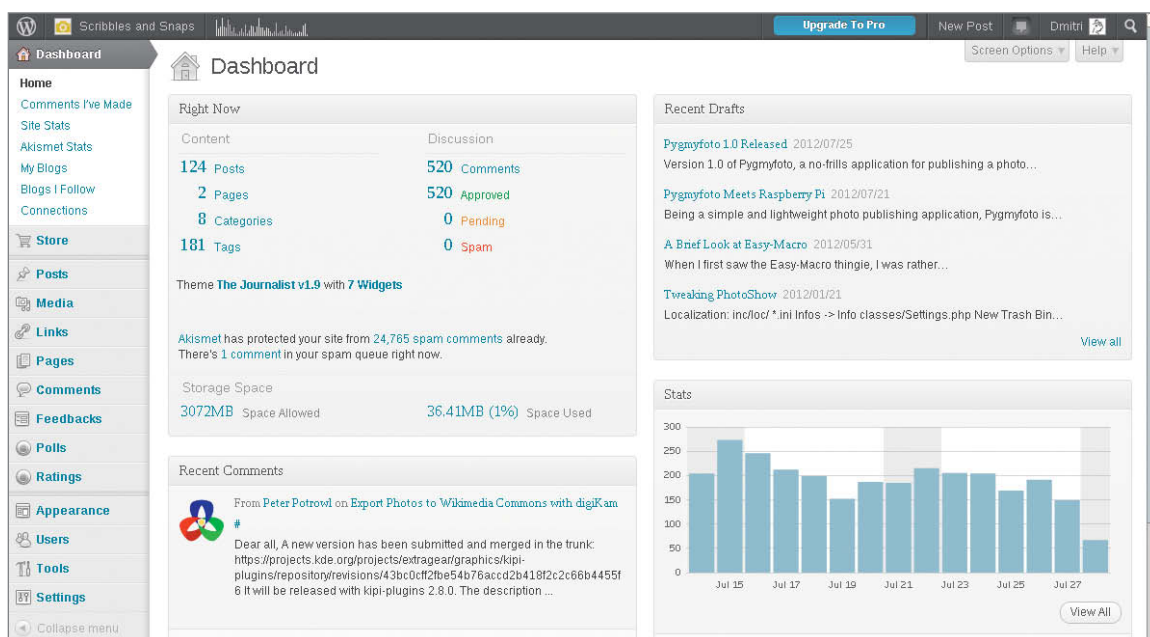
also hands you the responsibility for keeping things running smoothly. If you are not prepared to be your own system administrator, you might want to consider using the *WordPress.com* hosting service offered by Automattic, the company that develops *WordPress* software. Hosting a blog with *WordPress.com* is a great solution for photographers who don't want to get involved with installing and maintaining *WordPress* and dealing with system administration tasks on a daily basis. Hosting a blog at *WordPress.com* means that you don't have to worry about security fixes, updates, bandwidth costs and the stability of your internet connection. Better still, it won't cost you anything – the basic blog functionality is available free of charge, and you can extend it by upgrading to the Pro plan, which costs US\$99 per year and includes, among other things, domain mapping (use your own domain name instead of *wordpress.com*), custom design (for tweaking your blog's appearance) and the ability to host HD videos. Each of these options can be purchased separately, so if, for example, you are only interested in the custom design feature, you can enable just that for US\$30 per year.

Hosting your blog with *WordPress.com* does have some limitations, and you can't add your own themes and extend functionality by installing plug-ins. The themes question is not much of an issue, as *WordPress.com* offers free and premium themes which (if the custom design option is enabled) you can tweak to your liking. A lack of plug-ins can, however, be a limiting factor, as it prevents you from using *WordPress* to

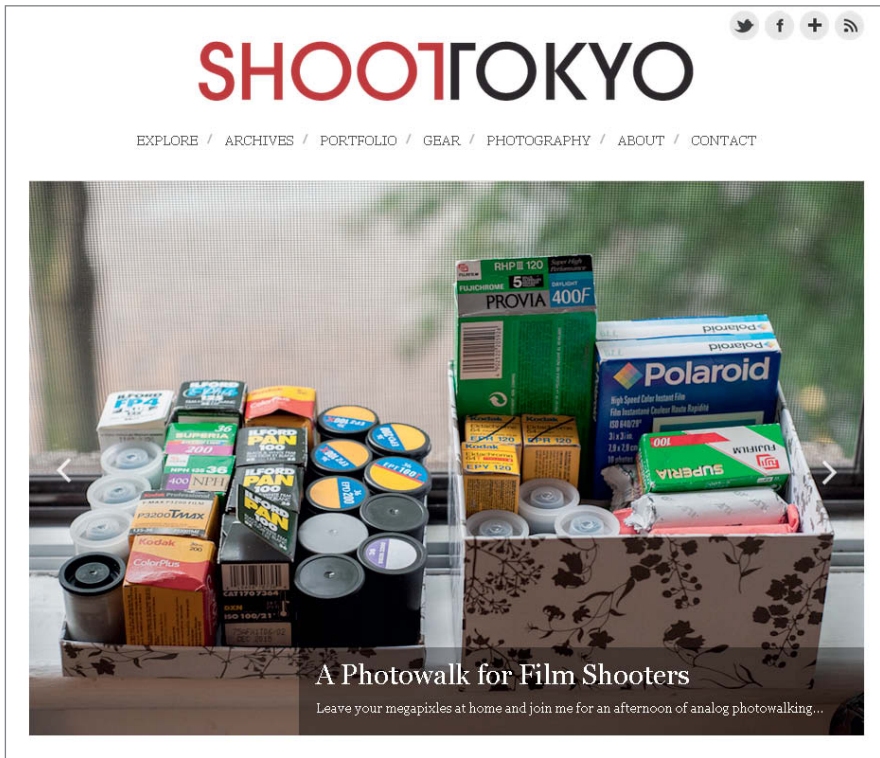
its full potential. The good news is that if you choose to host your blog with *WordPress.com*, you can still migrate to a different provider or your own server later. This way, you can start with a simple blog and move on to a different solution when your needs outgrow the basic functionality the service provides. In fact, *WordPress.com* provides a simple export tool for doing just that. In short, *WordPress.com* offers a really simple way to launch your own blog and, once you have mastered the *WordPress* basics, you can switch to a different hosting solution to get the most out of the options it offers.

## Getting Started with WordPress.com

Setting up a blog on *WordPress.com* is straightforward and can be achieved in minutes. If you don't have a *WordPress.com* account, simply point your browser to <https://signup.wordpress.com/signup/> to access the account registration form. Pick a name for your blog, specify login credentials, choose the desired language and hit the 'Create Blog' button. You can then use the activation e-mail sent to the address you specify during registration to activate your blog. Once you've done that, all you have to do is pick a theme (or simply keep the default one) before you are automatically dropped into the administrative interface of your blog, which you can access at any time via [<yourblog.wordpress.com/wp-admin>](http://<yourblog.wordpress.com/wp-admin>). The **Dashboard** section is the default landing point, and features several useful widgets, including QuickPress (handy for creating a



The Dashboard allows you to manage your blog, view statistics and manage comments. You can customize the Dashboard by adding and removing widgets.



ShootTokyo is based on *WordPress*. The photoblog has a clear and attractive design.

quick blog post), Stats (for displaying your blog's statistics) and Recent Comments (which shows a list of the most recent comments and lets you manage them). To customize the **Dashboard**, click the *Screen Options* tab.

Before you start populating your blog with posts, you can configure it in the **Settings** section. In the **General Settings** subsection, specify a tagline for your blog, select the correct time zone, date and time formats, and choose an appropriate icon. Next stop is the **Sharing** subsection, where you can connect your blog to popular social networks and configure sharing buttons.

WordPress.com supports all popular social networks, including Google+, Reddit, Pinterest, Twitter, Facebook and others. The service also features dedicated buttons for sharing blog posts via e-mail and re-posting them on other *WordPress* blogs. In the **User > My Profile** subsection, you can provide basic personal info, contact details and links to other websites and services. The **Personal Settings** subsection lets you enable and configure a raft of options, including the geotagging feature, which you can use to attach location information to blog articles. There is also a proofreading feature that

supports various languages and helps you to catch grammar and style errors that might otherwise go unnoticed.

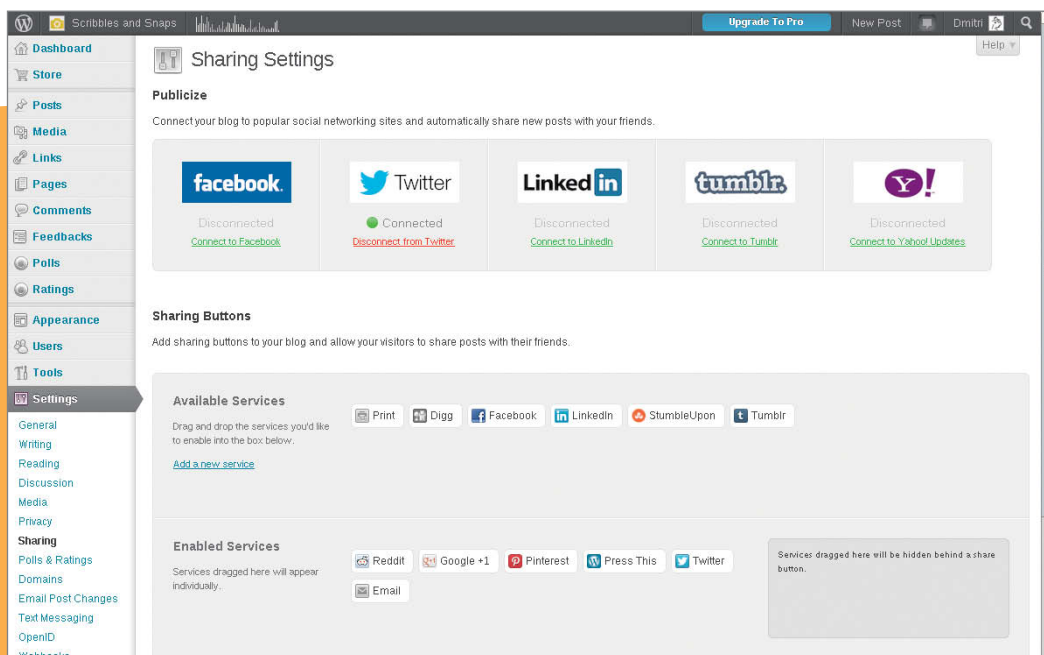
The next step involves picking a theme and configuring the overall appearance of your blog. WordPress.com offers dozens of free and premium themes, including a few designed specifically for photographers (such as Nishita, Duotone, Portfolio and Photography). To apply a theme to your blog, switch to the **Appearance > Themes** subsection, select a theme you like and press the *Activate* link located next to its name. If your chosen theme supports widgets, your next stop should be the **Appearance > Widgets** subsection. *WordPress* widgets are containers for different types of content. For example, the Flickr widget displays photos from your Flickr photo stream, while the Image widget can be used to display a single, static image. There are many widgets to choose from, and adding them to your blog's sidebar is easy – simply drag the widget you want from the Available Widgets panel to the Sidebar panel. Some widgets require some additional tweaking once you have added them – for example, to make the Flickr widget work properly, you need to provide your Flickr feed's URL, specify the number of photos to display and enter the required thumbnail size.

Once you've configured your blog, you can start adding content, and *WordPress* makes this extremely easy to do. The fastest way to publish a short post is to use the QuickPress widget in the **Dashboard** section. For lengthy articles, you can use the dedicated editing interface, which offers all the essential tools for working with text and images. In addition to blog articles, *WordPress* also lets you create custom pages, which can be useful for publishing static content for your blog. For example, you can create a page containing information about you and your photography business, a page with a list of useful photo resources or anything else that you think is relevant to your work.

Although *WordPress* is a complex application, its intuitive design makes it simple to master. And remember, once you've learned the ropes, you can migrate your blog to a self-hosted solution, opening up a whole new world of plug-in-based photo publishing options.

**Setting up a blog on WordPress.com is really simple. Fill out a short registration form, activate your account and you are good to go.**

In the Sharing subsection, you can connect your blog to popular social networks and enable various sharing options. WordPress.com supports Google+, Reddit, Twitter, Pinterest and other social networks. Enabling and configuring sharing functionality gives your blog better exposure and can help to attract readers.



## Installing and Hosting WordPress

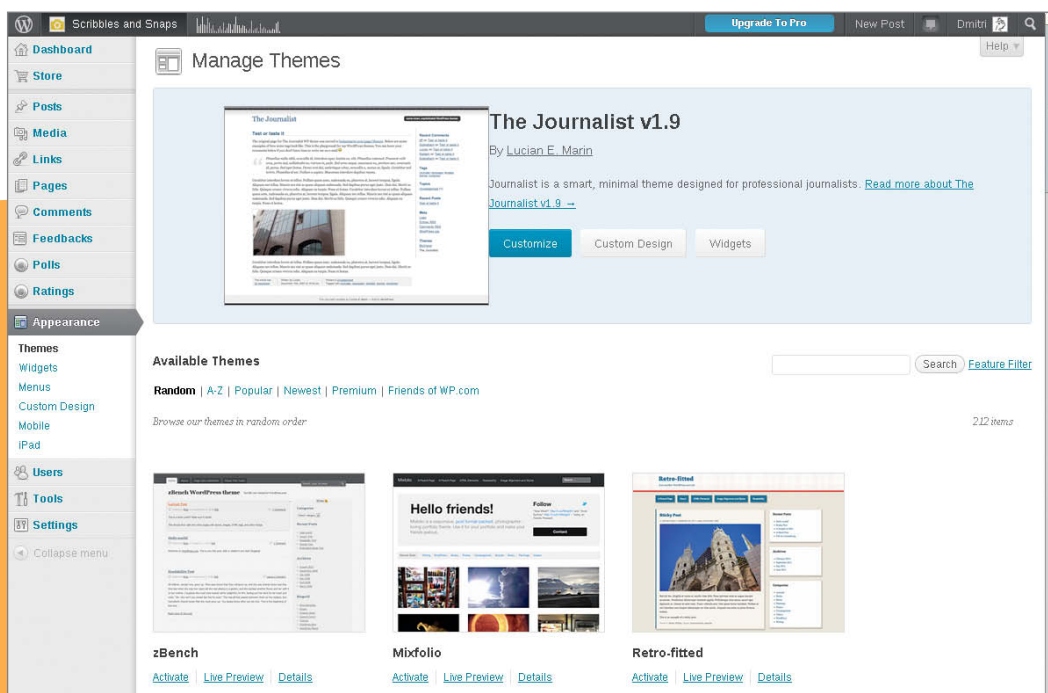
The major advantage of self-hosting a WordPress blog (either on your own server or using a hosting provider) is the ability to extend its functionality using plug-ins and custom themes. The simplest way to host your own WordPress blog is to use a provider who offers WordPress as part of a hosting plan. This approach offers the best of both worlds: you retain full control over your WordPress installation without the hassles of

deploying and maintaining your own server. Many established hosting providers support WordPress, but, if your technical skills are up to scratch, you can install and run it on your own server. A precise description of the installation procedure is beyond the scope of this article, but the 'Installing WordPress' web page at [http://codex.wordpress.org/Installing\\_WordPress](http://codex.wordpress.org/Installing_WordPress) provides all the information you need to get started.

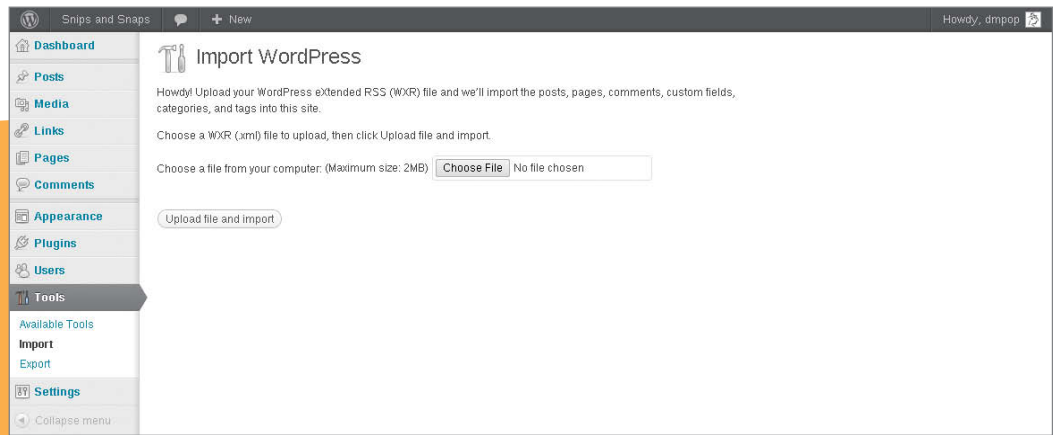
If you are migrating from the WordPress.com service, you don't have to start from scratch. In the administration interface of

your WordPress.com blog, switch to the **Tools > Export** subsection, click on the Export link, choose the *All content* option and click the 'Download Export File' button. Then, in the administration interface of your self-hosted blog, navigate to the **Tools > Import** subsection, and click on the WordPress link. You will then be prompted to install the WordPress Importer plug-in. Once you've done that, you can import the downloaded export file. By the way, the import tool can handle content from other popular publishing services too, including Blogger, Movable Type and Tumblr.

WordPress.com offers a wide selection of free and premium themes, including some designed specifically for photographers



The *WordPress Importer* plug-in allows you to quickly and easily import existing blog content



### Extending WordPress using Plug-ins and Themes

There are plug-ins available that enable you to transform your blog into a powerful photo publishing platform. To get an idea of just how powerful *WordPress* plug-ins can be, we took a look at the *Photonic* (<http://wordpress.org/extend/plugins/photonic/>) and *YAPB* (<http://wordpress.org/extend/plugins/yet-another-photoblog/>) modules in combination with the *Grain* theme ([http://sourceforge.net/apps/mediawiki/wp-grain/index.php?title=Main\\_Page](http://sourceforge.net/apps/mediawiki/wp-grain/index.php?title=Main_Page)).

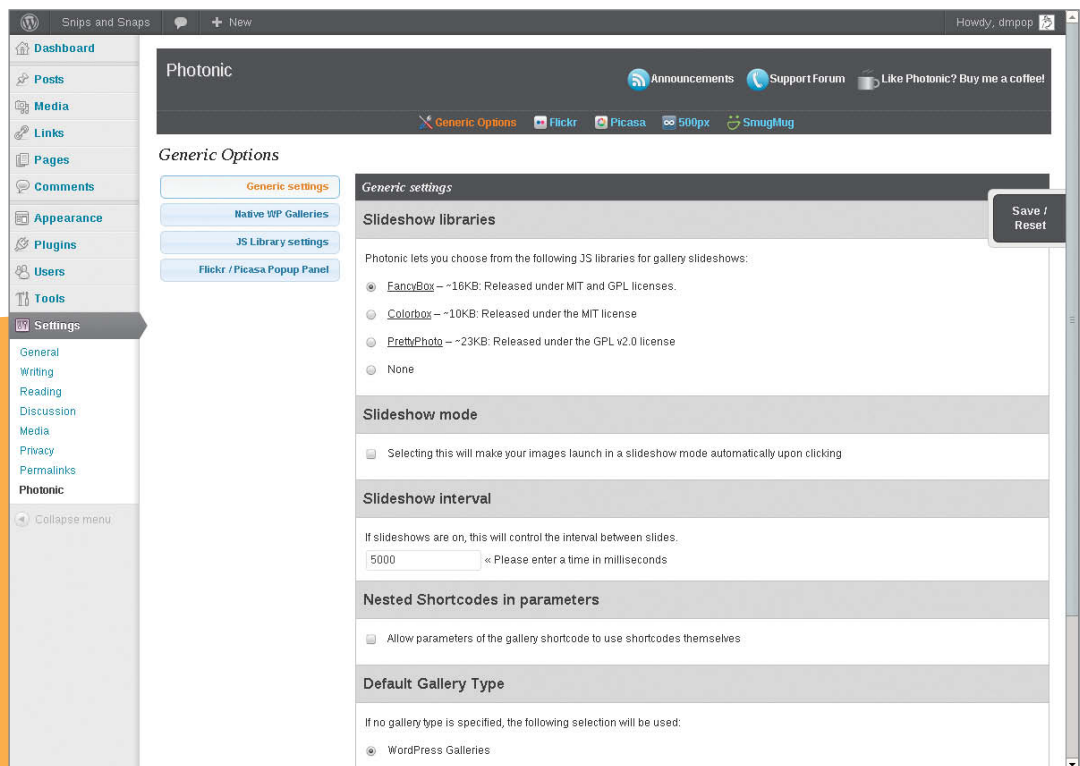
Plug-ins for embedding photo galleries in blog articles are a dime a dozen, but most of them don't offer the same level of

functionality as *Photonic*. In addition to a wide array of features, this plug-in supports several popular photo sharing services including Flickr, Picasaweb, 500px and SmugMug. This feature alone makes it a great choice if you plan to showcase photos hosted by other services on your *WordPress* blog.

Installing and enabling *Photonic* (or any other *WordPress* plug-in) is very simple. Navigate to the **Plugins > Add New** subsection in the administrative interface, use the *Search* field to find the appropriate plug-in and click the 'Install Now' button. Switch to the **Installed Plugins** subsection, and click on the *Activate* link next to the newly installed item. To set up *Photonic*, navigate to the **Settings > Photonic**

subsection. Leave the general settings at their default values for now and configure the services you want to use with your blog. To enable Flickr functionality in *Photonic*, you need to specify your Flickr API Key and Secret. If you don't have a Flickr API key, you can obtain a non-commercial one free of charge from [www.flickr.com/services/api/misc.api\\_keys.html](http://www.flickr.com/services/api/misc.api_keys.html). You also need to find out your Flickr ID, which is required for embedding photos from your Flickr account in a blog post. The simplest way to do this is to use the *idGettr* service (<http://idgettr.com/>). Adding a gallery to a blog article is a simple matter of using the `[gallery]` shortcode and some appropriate parameters, for example:

The *Photonic* plug-in allows you to embed individual photos and photo sets as galleries in blog posts, and also supports popular photo sharing services such as Flickr, Picasaweb, 500px and SmugMug. The plug-in has a wide range of settings and options for you to tweak.



# Photonic



The *Photonic* plug-in in action. Here you can see how to select a specified number of photos for display.

[gallery type='flickr' user\_id='82643076@N00' view='photos']

You can specify other optional parameters, too. For example, if you want to display only photos containing specific tags, you can do this using the tags parameter as follows: [gallery type='flickr' user\_id='82643076@N00' tags='flowers,macro' view='photos']

The sort parameter lets you specify a sort order using one of a range of supported values, including *date-posted-asc*, *date-posted-desc*, *date-taken-asc*, *date-taken-desc*, *interestingness-desc*, *interestingness-asc* and *relevance*.

To limit the number of photos shown in your gallery, use the *per\_page* parameter. The following example displays the first 35 photos with the flowers tag from your Flickr photo stream:

[gallery type='flickr' user\_id='82643076@N00' tags='flowers' per\_page='35' view='photos']

Photonic can be used to embed individual photos too, using the *photo\_id* parameter:

[gallery type='flickr' view='photo' photo\_id='4638718670']

Similarly, you can embed photosets, galleries and collections:

[gallery type='flickr' user\_id='82643076@N00' view='photosets'] [gallery type='flickr' user\_id='82643076@N00' view='galleries'] [gallery type='flickr' user\_id='82643076@N00' view='collections']

While *Photonic* adds the ability to pull photos from third-party photo sharing services and embed them in blog articles, the *YAPB* (Yet Another Photo Blog) plug-in transforms a regular *WordPress* blog into a complete photoblogging platform. Since *YAPB* is just a regular *WordPress* plug-in you

can install and activate it using the procedure described above, but to make the most of its capabilities, you will either have to tweak the current theme or use *YAPB*-compatible themes like *Grain*. To add and activate this or any other theme, download and unpack the latest version and move the resulting folder to the *wp-content/themes* directory within your *WordPress* installation. In the administrative interface of your blog, switch to the **Appearance > Themes** subsection, where you should see the new theme in the Available Themes list. Click on

The *YAPB* plug-in transforms a *WordPress* blog into a complete photoblogging platform. Once installed and activated, *YAPB* adds a dedicated configuration subsection where you can modify the plug-in's settings and behavior.

The Grain theme has several settings you can modify, including navigation, appearance and copyright information

**Copyright Settings**

**Copyright Holder**

Here you can enter your copyright information and tell Grain how to display them.

First copyright year: % % is always the current year

Last copyright year: % % is always the current year

Offset to end year: 0 i.e. 10 to get 2022 if the end year is 2012

Here you can configure the informational text, e.g. your name and a licensing info.

Copyright holder: (Your name) (HTML)

Keep this short, e.g. "John Doe". This info will be embedded in the page's meta header.

Full copyright holder and info: <em>(Your name)</em> (HTML v)

e.g. "John Doe. All rights reserved." This info will be visible to the visitor.

**Imprint Page**

Grain uses [Dublin Core](#) meta tags to describe your blog. If you have an imprint page you may set it here. If you do not have an imprint or do not want to propagate it through the DC meta tag the field can be left empty.

Imprint URL: (HTML)

The URL to your imprint page. Leave empty if you do not want to embed an `dc:rights` meta tag.

**Creative Commons License**

Embedding a Creative Commons License

If you like to, you can publish your photos under a [Creative Commons](#) License. You can choose a license [here](#).

Copyright:  **Embed Creative Commons license**

Unchecking this option will remove the Creative Commons Logo, the textual message, as well as the embedded [RDE](#) (if any). This is the way to go if you want your photos to be published as, e.g. "All rights reserved".

the *Activate* link next to the new theme to enable it.

Both the *YAPB* plug-in and the Grain theme are highly configurable, and offer a long list of settings for you to tweak. To configure the plug-in, switch to the **Settings** > **YAPB** section. You can leave most of the available settings at their default values, but it is preferable to uncheck the *Activate automatic image rendering in general* option in the Automatic Image Insertion group if you want to improve the plug-in's compatibility with the Grain theme.

The Grain theme features various settings for you to tweak, and you can edit them in the appropriate section of the administrative interface. All available options contain brief descriptions, which makes configuring them much easier. Even if you leave most of the options at their default values, it's a good idea to configure the copyright settings right from the start. To do this, switch to the **Copyright Settings** subsection and specify your desired values. At the very least, you should enter your name in the *Copyright holder* and *Full copyright holder* and *info* fields. If you want to release your photos under a Creative Commons license, enable the *Embed Creative Commons license* option and specify the appropriate license.

While the combination of *YAPB* and Grain transforms *WordPress* into a useful photoblogging platform, it doesn't significantly change the program's basic functionality, and instead adds some new

options to the editing interface. When you create a new blog article or edit an existing one, you can attach photos using the *YAPB* Image widget and specify additional settings using the Grain Options For This Post widget.

*YAPB* itself can be extended using additional plug-ins, and the *YAPB-queue* extension (<http://wordpress.org/extend/plugins/yapb-queue/>) is one module that you should definitely consider installing. This extension enables you to automatically publish photos at predefined intervals. This is extremely useful if, for example, you are traveling and don't have regular Internet access. You can then upload multiple photos when you have an opportunity and let *YAPB-queue* take care of the rest. Once you have installed the plug-in in the usual way, all you have to do is transfer the photos you wish to publish to the `/wp-content/uploads/yapq-input` directory within your *WordPress* installation and specify the start time and appropriate intervals in the **Posts** > **YAPB queue** subsection of the administrative interface.

If you want to manage your blog when you're on the road, you'll appreciate the *WordPress* app, which is available for all popular mobile platforms, including iOS and Android. You can use it to draft and publish blog articles, manage comments, view statistics and much more besides. The app includes a powerful text editor with rich formatting functionality and the 'Quick Photo' button on the Dashboard lets you take

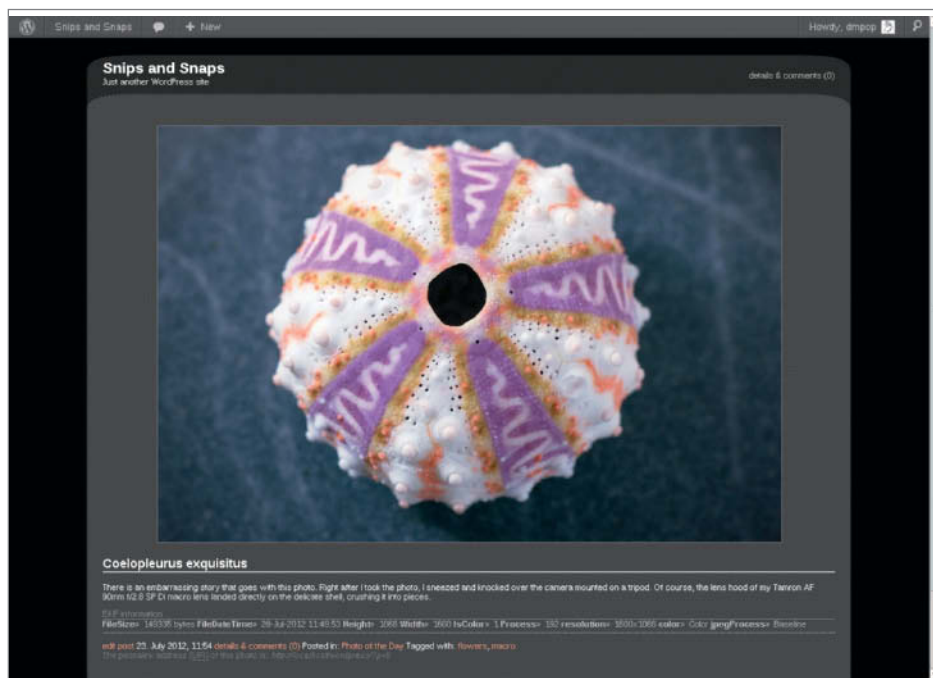
a quick snap and push it to your blog without leaving the app's interface. This feature is particularly useful if you use your blog to document your work or your travels. Whether you use an iPhone, an iPad or an Android-based device, the *WordPress* app is a great tool for managing your blog when you are out and about.

## Learning from Other Photographers

The best way to gain inspiration and learn more about using *WordPress* as a photographer is to study existing photoblogs and learn from other photographers' experiences. *WordPress.com* offers a series of articles that cover all the photoblogging basics, from choosing a theme to building connections. The individual pages can be found at <http://en.blog.wordpress.com/2012/05> by adding the following extensions to the URL:

/14/photo-blogging-101-part-1/  
/21/photo-blogging-101-part-2/  
/28/photo-blogging-101-part-3/.

The *Japan in 365 days* blog (<http://picturesinjapan.wordpress.com/>) is a great example of a photoblog hosted using the *WordPress.com* service. The blog is a platform for a project that publishes a new photo every day for a year. The blog is based on the minimalistic *Twenty Ten* theme, which lacks any visual embellishments but does feature several interesting tweaks. For example, the header is configured to display



creating-shoottokyo/, where you can read a bunch of useful tips and tricks that are sure to help you build your own blog.

The website belonging to photographer Alfie Goodrich (<http://www.alfiegoodrich.com/>) takes a different approach, using *WordPress* as the basis for an online portfolio that showcases the author’s work, instead of presenting a conventional blog.

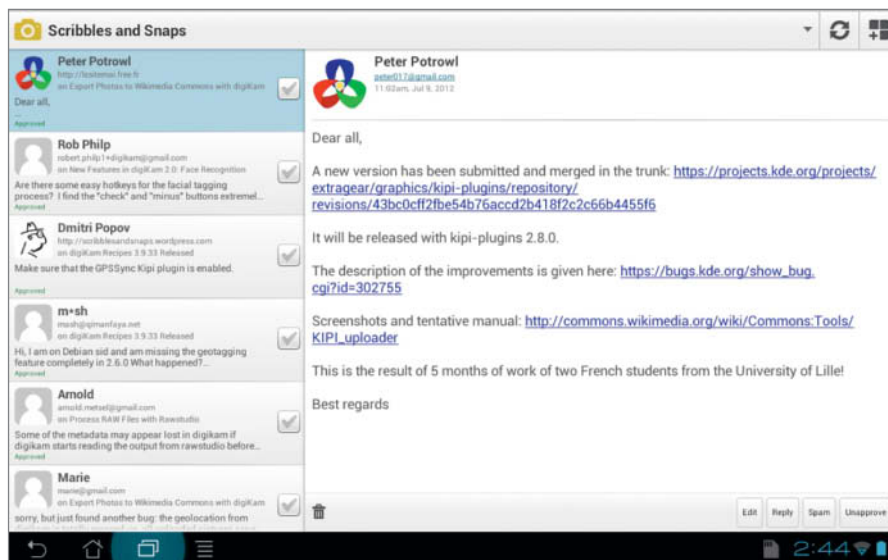
### Final Words

It is no coincidence that *WordPress* has become the blogging platform of choice for many photographers. This powerful blogging engine offers a wide range of publishing tools wrapped in a user-friendly interface. Themes and plug-ins extend the program’s functionality and allow you to customize it to fit your specific needs.

Here is a *WordPress* blog showing tweaks configured using the *YAPB* plug-in and the *Grain* theme

the photo from the blog post that is currently being viewed, while the Image widget in the sidebar is used to display a link to a shop where you can order other featured photos. The sidebar also lets visitors subscribe to blog updates and displays the latest tweets from the author. Additionally, each post offers an assortment of sharing buttons courtesy of *WordPress.com*’s sharing functionality while other pages provide a brief intro and the author’s contact information. This blog is a classic example of what can be done using the tools offered by the *WordPress.com* service.

*ShootTokyo* (<http://shoottokyo.com/>) is another Japan-related photoblog based on *WordPress*, but this time hosted using a third-party provider. The blog also sports a minimalistic look and includes several interesting features. It makes heavy use of pages for longer articles, which are all nevertheless easily accessible via a navigation menu. The Explore section of the blog presents photos organized into



Using the *WordPress* app (available for iOS and Android), you can work on blog articles, manage comments and check statistics on the go. The Quick Photo shortcut allows you to snap photos and publish them straight to your blog.

thematic collections, and the photos in each collection are displayed as large thumbnails with mouse-over functionality that reveals information about each image. The blog’s author describes the process of building the site at <http://shoottokyo.com/2011/09/23/>

*WordPress* also offers a range of hosting options and there is a wealth of resources available online to help you get started. Whether you are a hobbyist or a pro photographer, *WordPress* is one of the best blog-building solutions out there. (jr)

BLOGGING TOOLS FOR PHOTOGRAPHERS		
Tool	URL	Description
Automatic	<a href="http://automatic.com/">http://automatic.com/</a>	Wordpress.com Hosting-Service
WordPress registration	<a href="https://signup.wordpress.com/signup">https://signup.wordpress.com/signup</a>	Starting point
Photonic	<a href="http://wordpress.org/extend/plugins/photonic">http://wordpress.org/extend/plugins/photonic</a>	Embedding photogalleries
YAPB	<a href="http://wordpress.org/extend/plugins/yet-another-photoblog">http://wordpress.org/extend/plugins/yet-another-photoblog</a>	Transforming a WordPress blog into a photoblogging platform
Grain	<a href="http://sourceforge.net/apps/mediawiki/wp-grain">http://sourceforge.net/apps/mediawiki/wp-grain</a>	YAPB-compatible themes
yapb-queue	<a href="http://wordpress.org/extend/plugins/yapb-queue">http://wordpress.org/extend/plugins/yapb-queue</a>	publish photos automatically at predefined intervals



## FAQ: Managing and Enhancing WordPress

### Installation Errors

*I've downloaded the software from WordPress.org and unpacked it to my server directory, but the install wizard doesn't load when I access its URL.*

There are two things which can prevent the five minute installation on Windows from working. Some users will need a .htaccess file that isn't included with the zipped WordPress package. To see if this is the case, create a trial file with this name and try once again to open your blog's URL. If that doesn't work, you may not have appropriate user access rights. The server administrator requires read and write permissions not only for installation, but also so that one-click updates, themes and plug-ins can be installed from the administrator interface.

### Switching Blog Services

*I have been using a different blog service or software. How do I make the switch to WordPress easier?*

WordPress offers import plug-ins for data stored with a variety of blog services, which you can install with a single click from the Tools > Import section of the admin interface. The most common services, such as Blogger, Tumblr, Movable Type and LiveJournal are supported, but if you can't find the plug-in you are looking for right away, take a look in the plug-in directory.

### Data Security

*How do I back up my blog?*

The simplest way is to regularly log in to your hosting service and use the automatic backup and database dump tools on offer.

Alternatively, the *WP-Database-Backup* plug-in enables you to automate the creation of regular custom backups. You can then have these backups sent to you via e-mail, download them from the Tools > Backup section of the admin interface or save them on the server.

The *BackupWordPress* plug-in offers a complete backup solution and copies a database dump to your WordPress directory. You can set it up to mail you your backups, or just a download link if the size of the resulting file exceeds a preset limit. Remember to exclude the wp-content/backups/ folder from future backups.

### My Design has been Overwritten

*WordPress lets me customize my site design without any problems, but overwrites it when I perform an update.*

Unfortunately, this is how the software works. All your changes are overwritten when you update your themes. The solution is to create a child theme. To do this, create a new folder with a new name in the wp-content/themes/ folder. A child theme has to contain a styles.css file with the following code lines at its start:

```
/*
Theme Name:          themename
Template:             parentname
*/
@import url(../parentname/style.css);
```

You can select any name you like for your new theme name, and the template should have the same name as the parent theme, written in lower case letters with hyphens between multiple words if applicable. You can then customize individual parts of the imported Style Sheet without overwriting everything. As long as you use exactly the same filenames and storage locations for your child theme as you have for the theme from which it inherits its attributes, any attributes present in the parent theme will simply be overwritten by the new ones.

### Googled Designs

*Am I allowed to use designs that I find on the Web?*

It is safer to use only themes offered at the official project website. Any designs that

you find by searching for 'free WordPress themes' are highly likely to contain hidden malware. Stick to themes that you can install directly from the WordPress Dashboard. These also include a preview.

### Analytics Tools

*Which analytics tools can I use with WordPress?*

Hosting your own blog makes it easier to conform to the data privacy laws that apply where you live. Many WordPress users use the open source *Piwik* package. This is simple to install and should be located in the same directory as your blog on your Web server.

Copy the authentication token from the API page in the Piwik admin interface and install the WP-Piwik plug-in. Paste the URL of your Piwik installation and the copied token into the settings page. Now all you have to do is use the plug-in to embed the appropriate java code in the footer of each page you want to analyze. Once you have set it up, Piwik delivers regular, fresh Web usage statistics. (rzl)

**Piwik and the WP-Piwik plug-in help you capture and analyze your blog's stats**





## Photographing Children

Photos of kids are often really cute, but that's exactly what sometimes gives them an uninspiring, ten-a-penny look. We give you useful tips and explain techniques to help you shoot quality 'kidpics' that will not only please the parents, but that have real photographic value too.

## Open Source Photo Workflow Tools

Dedicated RAW converters, image editors and database tools have been making way for all-in-one photo workflow tools like *Lightroom* for some time now. As ever, the open source community is never far behind and has already produced its own successful all-in-ones, such as *RawTherapee*, *digiKam* and *GTKRawGallery*. We test seven of the latest open source RAW tools and give you the low-down on who's ahead in this particular race.



## Cool Home-build Projects

How about a home-made tilt/shift lens or a macro lens converted for use as a microscope? Or ultra-high-speed photo sequences that you can shoot at home? This exclusive workshop shows you three inexpensive home-build projects that produce fascinating and unusual visual results.

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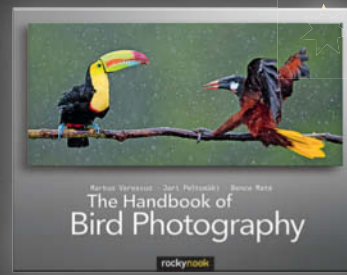


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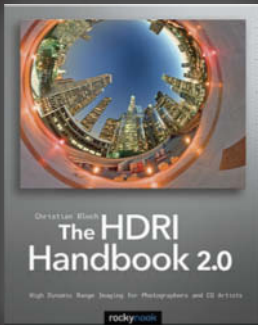
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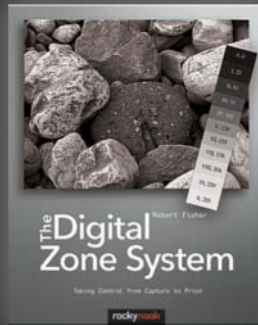


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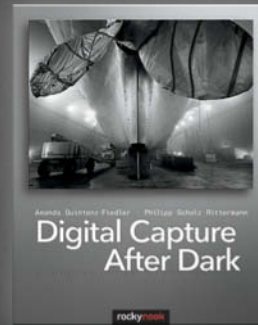


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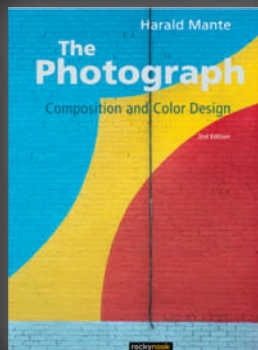
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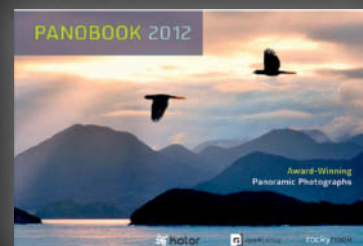


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