Images:

Effective Workflows

The small print

Prerequisites
Time in the workshop is precious – it is an opportunity for you to interact with the workshop leader and other participants through questions and discussions and to share your experiences and concerns. To make the most of this time we sometimes ask you to carry out learning activities ahead of the workshop so that everyone comes into the class with the same basic knowledge. We keep this prior learning to a minimum and often make use of online videos. Online videos provided through LinkedIn Learning can be accessed free of charge by University members anytime, anywhere, through a browser or app.

Your course booking will tell you if any prior learning activity is required. If you don't have an environment where you can do this learning, you can come along to one of our LinkedIn Learning sessions. These are a quiet space where you can work through videos or other workshop resources.

If you arrive for a workshop without having done the prior learning, the workshop leader may suggest that you come back on another session.

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About the workshop designer
Carl Wenczek is a very experienced architectural illustrator and an expert in 3d modelling and 2d imaging. He is a Director of his own small company and over the last 18 years has built long lasting relationships with his clients, creating 100's of illustrations and helping them convey their ideas and designs.

Running parallel to his commercial work, Carl is also a part-time lecturer in multimedia and has been teaching at Oxford University's IT Services for the last 17 years, delivering courses in Photoshop, Illustrator, InDesign, After Effects, Blender, GIMP, Inkscape and digital photography.

Carl also coaches Paddlesport (kayaking, canoeing and stand up paddling) and Indoor Climbing. These sports are often coached in demanding and dynamic environments and require a calm persona!

Revision history

Version	Date	Author	Comments
1.0	January 2017	Carl Wenczek	First version
2.0	March 2020	Carl Wenczek	Adapted to workshop format
2.1	May 2020	Carl Wenczek	Updated further information text
2.2	September 2022	Carl Wenczek	Text changes to clarify the instructions for Photoshop and GIMP, checked links

About this workshop

Does your research paper or departmental web site need eye-catching images? The aim of this workshop is to introduce you to the general principles and techniques for working with digital images.

What you will learn

We will be using *Adobe Photoshop* or *GIMP*. You will be introduced to a model workflow for image manipulation and correction, preparing images for documents and presentations and for optimising images for the web.

What you need to know

You do not need any prior knowledge of *Adobe Photoshop* or *GIMP*.

This workshop will cover:

• Correcting and improving images
• Using a model workflow
• Preparing images for documents, presentations and the web
• Output
• Good working practices

If you need to review these activities, LinkedIn Learning is a great place to get guidance. There is an activity with relevant videos in the IT Learning Portfolio: visit skills.it.ox.ac.uk/it-learning-portfolio and search for "Photoshop", "GIMP" or "Images activity".

The resources you need

Sample documents that you can use to experiment with will be made available, but you may like to bring along your own.

The resources for most workshops, including any pre-course activity, are in the IT Learning Portfolio: visit skills.it.ox.ac.uk/it-learning-portfolio and search for "Photoshop", "GIMP" or "Images".

Unless you have been told otherwise, in classroom workshops there will be a computer available for you to use with Adobe Photoshop or GIMP installed.

You can use your own computer with your preferred app installed if you want to – just bear in mind that I am not an expert in every app (although I am sure that between us we will be able to sort out most problems!)

Contents

Learning Objective 01 - Work with a RAW image

A RAW file is an uncompressed version of an image file. The camera takes the image data from the sensor and saves it in an unedited (unprocessed) and uncompressed format on the memory card.

RAW files contain many more shades of colours compared to JPEG files - RAW files have 12 or 14 bits of intensity information per channel (4096-16384 shades), compared to JPEG's 8 bits (256 shades).

For more information see the handout and the link below:

https://en.wikipedia.org/wiki/Raw_image_format

For Photoshop use:
• Adobe Camera RAW. Camera Raw gives you everything you need for processing raw images.

For GIMP use:
• A third party plugin such as UFRaw.

Learning Objective 02 - Rotate, Crop and apply Lens Corrections

Cropping is one of the most fundamental photo manipulation processes. It is usually carried out to remove an unwanted object or to tidy up the edges of a photograph, to change its aspect ratio or to improve the overall composition.

As a compositional tool, cropping can be used for dramatic effect or to help create a focal point.

For Photoshop:
- Use the **Lens Correction Filter** and the **Crop Tool**.

- To make the cropping process non-destructive, deselect **Delete Cropped Pixels**.

For GIMP:
- Use **Filters>Distorts>Lens Distortion**, the **Rotate Tool**, the **Perspective Tool** and the **Crop Tool**.

Learning Objective 03 - Repair an image

Photoshop or **Photoshopping**
2. (*transitive verb*)
to alter (a digital image) using Photoshop or other image editing software

It's always good to try and get your photographs right in-camera but there are times when this isn't possible. Perhaps you had your thumb over the lens or you have a distracting object in the background that you didn't notice when you took the photograph. Old, scanned images may be damaged and need repairing. New photographs may include specks caused by dust on the digital sensor.

It is possible to remove unwanted parts of your photographs by covering them up with details from other parts of the photograph. You can "clone" from one part of an image to another.

For Photoshop use:
• The **Clone Stamp Tool** or the **Healing Brush Tool**.

• **ALT + Click** to set the clone source and then click-and-drag to paint over the area you want to repair/remove.

For GIMP use:
• The **Clone Tool** or the **Healing Tool**.

• **CTRL + Click** to set the clone source and then click-and-drag to paint over the area you want to repair/remove.

Learning Objective 04 - Apply Tonal range and colour adjustments

Tonal range is the measure of image brightness from the darkest pixels (black) to the lightest pixels (white). The range between the different brightness levels within your images determines it's degree of contrast:

| High | Medium | Low |

Tonal range and colour can be adjusted using a variety of tools and techniques.

For Photoshop use:
   • **Levels** for tonal range adjustment and either **Hue/Saturation** or **Colour Balance** for colour adjustments.

For GIMP use:
   • **Levels** for tonal range adjustment and either **Hue-Saturation** or **Colour Balance** for colour adjustments.

Learning Objective 05 - Apply Selective corrections

Until now we have worked on global corrections, but images my require different adjustments and corrections in different areas.

In our workflow, we always start with global corrections and then select the areas that remain and apply local adjustments. To do this we can select specific parts of the image using a wide variety of selection tools and then edit those regions without affecting the rest of the image.

Selection tools fall into the following categories:

Type	Photoshop	GIMP
Manual	Rectangular Marquee, Elliptical Marquee, Lasso, Polygonal Lasso	Rectangular Select, Ellipse Select, Free Select
Assisted	Magnetic Lasso, Quick Selection	Scissors Select
Colour based	Magic Wand, Eyedropper	Select by Color, Color Picker

For GIMP:
   • Make selections and then apply adjustments in the usual way.

For Photoshop:

   • Make selections and then apply adjustments in the usual way.

For Photoshop only:
   • In order to make the process non-destructive use **Adjustment Layers**.

   • First make your selection

   • Then choose **Layer>New Adjustment Layer**.

Learning Objective 06 - Adjust Image Size for screen and print

For Screen

• Pixel dimensions only.

When it comes to displaying images on a screen you need to be aware of the size of the screen or monitor you will be using to display your images. For example, to fill a monitor that is 1920 by 1080 pixels in size so, you will need an image that is 1920 by 1080 pixels in size.

Date	Other High	1920x1080	1366x768	1280x1024	1280x800	1024x768	Lower
January 2021	41.5%	19.2%	24.8%	1.2%	1.5%	1.1%	10.7%

https://www.w3schools.com/browsers/browsers_display.asp

For Print

• Print size/document size.

• Resolution.

When preparing images for print you need to decide on the size you want to print the image (it's print or document size), and the pixel density or **resolution** (pixels per inch (ppi)). You might also need to decide if your image is big enough, see examples below:

Print size (mm)	Resolution (ppi)	Pixel dimensions
A4	300	2840 x 3508
	150	1240 x 1754
A3	300	3508 x 4961
A2	300	4961 x 7016

Nikon D750, 25 megapixels = 6016 x 4016

• For Photoshop choose **Image>Image Size**.

• For GIMP choose **Image>Scale Image** (for screen) or **Print Size** (for print).

Learning Objective 07 - Sharpen an image

Sharpening is a technique for increasing the apparent sharpness of an image. It can be used to emphasize texture and draw viewer focus. Sharpening needs to be carried out carefully because if it is applied too aggressively artifacts may appear or an image can appear too sharp when printed. For more information see *https://www.cambridgeincolour.com/tutorials/image-sharpening.htm*

Capture Sharpening →	**Creative Sharpening** →	**Output Sharpening**
Reduce blurring caused by the source of your image e.g. camera sensor, camera lens	Applied selectively and for artistic purposes	Appropriate to final media and to offset any softening caused by resizing an image

Common settings

Radius: Controls the size of the edges you wish to enhance, where a smaller radius enhances smaller-scale detail. Choose a radius setting that is comparable to the size of the smallest detail within your image. Try starting at a value of 1.

Amount: Controls the overall strength of the sharpening effect, and is usually listed as a percentage. Try starting at a value of 100%.

Threshold (Masking): Controls the minimum brightness change that will be sharpened. This can be used to sharpen more pronounced edges, while leaving more subtle edges untouched. It is especially useful to avoid sharpening noise.

- For Photoshop use **Smart Sharpen** and **Unsharp Mask** filters.

- For GIMP use the **Sharpen** and **Unsharp Mask** filters.

Learning Objective 08 - Save your images

Save your images as you are working on them in a native file format such as .psd (Photoshop) or .xcf (GIMP).

Master
.psd, .xcf

These native file formats retain information such as layers, adjustments and masks.

Once you have finished working on your images the file format you choose will depend on your intent.

Web
.jpeg, .gif, .png

Used for websites. GIF is more suitable for text and graphics and supports transparency. JPEG for photographs and realistic images. PNG for line art, text-heavy images, and images with few or solid colours, uses lossless compression and supports transparency.

Print
.jpeg (maximum quality), .tiff

TIFF is a lossless file format meaning it does not lose any image quality making it suitable for high quality prints and archival copies.

• For Photoshop use the **Save As** and **Save for Web** commands.

• For GIMP use the **Save As** and **Export As** commands.

Learning Objective 09 - Create Batch processes

Sometimes you might have a lot of images you need to edit. You may need them all at a specific size or want them all to follow a specific naming convention. Rather than editing them one by one you might want to consider setting up a batch process to do the work for you.

There are many standalone Batch Image Processors available. However, Photoshop comes with this feature included in the form of Actions and the Batch command.

For Photoshop:
   • Use the **Actions** panel.

   A Photoshop Action allows you to record a series of steps and then play the sequence back to apply those effects on a single image or a batch of files.

   • To run an Action on a series of images choose **File>Automate>Batch**.

For GIMP:
   • Use the Batch Mode, see *https://www.gimp.org/tutorials/Basic_Batch/*.

Learning Objective 10 (Optional) - Use Masks to blend images

Layer masks are a fundamental tool in image manipulations. They allow you to selectively modify the opacity (transparency) of the layer they belong to. This differs from the use of the layer Opacity slider as a mask has the ability to selectively modify the opacity of different areas across a single layer.

This modification of a layer's transparency through a mask is non-destructive to the layer itself.

For Photoshop:
• Use Layer Masks. Choose **Layer>Layer Mask**.

For GIMP:
• Use Layer Masks. Choose **Layer>Mask>Add Layer Mask**.

Correcting and Improving your images
a digital workflow

Evaluate image

Rotate, crop and correct perspective

Reduce noise and repair blemishes

Capture Sharpening

Tonal range adjustment

Colour balance

Saturation

Selective correction

Fine tuning of colours

Adjust mid-tone contrast
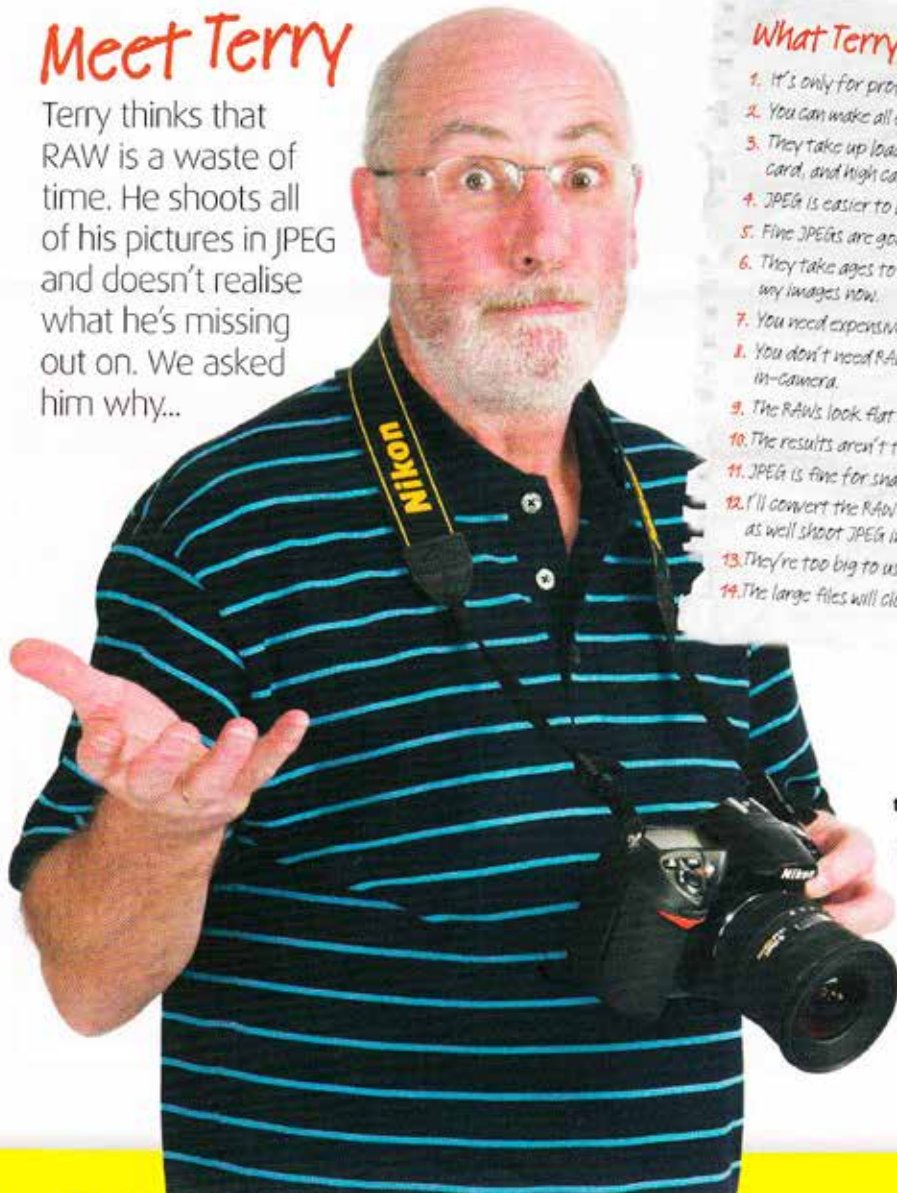
Resize image for final media

Sharpen for final media

Why aren't you shooting
RAW?

Meet Terry

Terry thinks that RAW is a waste of time. He shoots all of his pictures in JPEG and doesn't realise what he's missing out on. We asked him why...

What Terry says about RAW:

1. It's only for professionals.
2. You can make all enhancements in Photoshop.
3. They take up loads of space on my memory card, and high capacity cards are expensive.
4. JPEG is easier to use.
5. Fine JPEGs are good enough quality for me.
6. They take ages to process. I just want to enjoy my images now.
7. You need expensive software.
8. You don't need RAW if you get your shot right in-camera.
9. The RAWs look flat when I open them.
10. The results aren't true-to-life like JPEG.
11. JPEG is fine for snaps.
12. I'll convert the RAW to a JPEG anyway so I might as well shoot JPEG in the first place.
13. They're too big to use on the web or on e-mail.
14. The large files will clog up my hard drive.

Now if you believe any of that then you need to take a second look at RAW because, like Terry, you're missing out on one of digital photography's most amazing features. We can dispel all of these myths and we're confident that by the end of this feature you'll be shooting RAW like the rest of us.

WHAT *IS* RAW?

RAW is a type of image file format like JPEG, TIFF and PSD that can usually be selected from the quality settings menu in your camera. Unlike other file types, RAW contains the picture information exactly as it is read from the camera's image sensor before the camera's processor has had a chance to enhance the picture and turn it into a standard file type, like JPEG. The picture is unusable in the RAW state and needs to be converted into a standard image before you'll be able to do anything with it. Back on your computer, you can use a RAW converter to take the place of the camera's processor and turn the RAW into a TIFF or JPEG. This might sound like an unnecessary extra step but it does offer significant advantages. The main ones are quality and flexibility. RAWs are a lossless file, so give the ultimate image quality. Plus, you also have the opportunity to change the appearance of your image by adjusting the white balance, sharpness, exposure, contrast and saturation. The RAW data contains much more detail than a standard JPEG, so amazing quality adjustments can be made quickly and easily.

RAW FACT

Most RAW files are compressed, just like JPEGs, to reduce the file size. However, RAWs use a lossless compression which maintains all picture detail. JPEG compression degrades the image quality.

PROCESSED RAW FILE

JPEG FILE
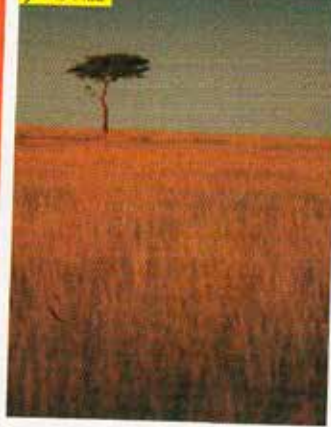
It's only for professionals

MYTH 1

RAW is for everyone, no matter what your experience. Every current D-SLR – and the majority of digital creative compacts – offers a RAW shooting mode, so it's simply a case of activating that option. In fact, we could even argue that RAW is better suited to beginners than professionals. As you'll see over the next few pages, RAW gives you the option to easily and effectively correct common photo mistakes including white balance, contrast and exposure. Although shooting RAW shouldn't be seen as an excuse for sloppy picture-taking, RAW can help you to bring some life back to a dud photo. Beginners are generally more likely to make these basic mistakes and so are more likely to benefit from RAW. They can give you a second chance to get a reasonable result from a once-in-a-lifetime photo opportunity if your camera settings have let you down.

You could be missing images like this! Our original JPEG doesn't live up to the memory at all, but using RAW we can get a much more punchy result.

MYTH 2

You can make all image enhancements in Photoshop anyway

Due to the lack of red in this image the white balance takes ages to correct in Photoshop and the result looks a bit naff.

Photoshop offers hundreds of ways to enhance JPEG photos but the very nature of RAW means that not all adjustments are possible, or at least, to the same degree. Two of these RAW corrections are exposure and white balance. The extra latitude held in a RAW file means that additional highlight and shadow detail can be found. In extreme cases this may mean that blown highlight

detail can be recovered where they'll remain pure white in JPEG. The control you have over white balance is also a big plus, as it can be changed to perfectly simulate the different settings on the camera. With JPEG, it's a time-consuming job to recover the white balance, particularly strong colour casts, and the results are seldom as good.

ORIGINAL PIC

PHOTOSHOPPED JPEG: 10 MINUTES
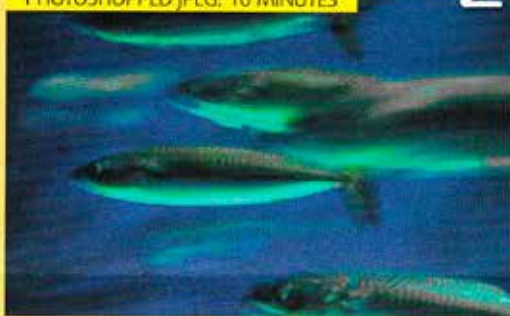
ENHANCED RAW: 1 MINUTE

MYTH 3

# They take up loads of space on my memory card

Yes, you're right, RAWs do take up more space on your memory card but that needn't be a problem. A RAW image is generally three to four times larger then the equivalent JPEG, which means you'll fit a third to a quarter of the number of shots on a card. However, we need to put this in perspective. With most RAWs you can expect 1 megapixel of image data to take up roughly 1 megabyte (MB) of space on your card. With an 8 megapixel camera, for example, the RAW images should be roughly 8MB each.

In this example, you'll be able to fit around 125 RAW pictures onto a 1 gigabyte (GB) card – this equates to three and a half rolls of 36-exposure film, which is plenty for the majority of users. As for the cost of memory, this is becoming less and less of an issue. Basic CF and SD cards now cost less them £20 for 1GB.

hama.
1GB
HIGHSPEED
CompactFlash Card
CE

RAWFACT

Amazingly, basic 1GB cards now cost roughly the same as film, shot-for-shot, when you consider the cost of developing, and that's not taking into account that the cards can be reused.
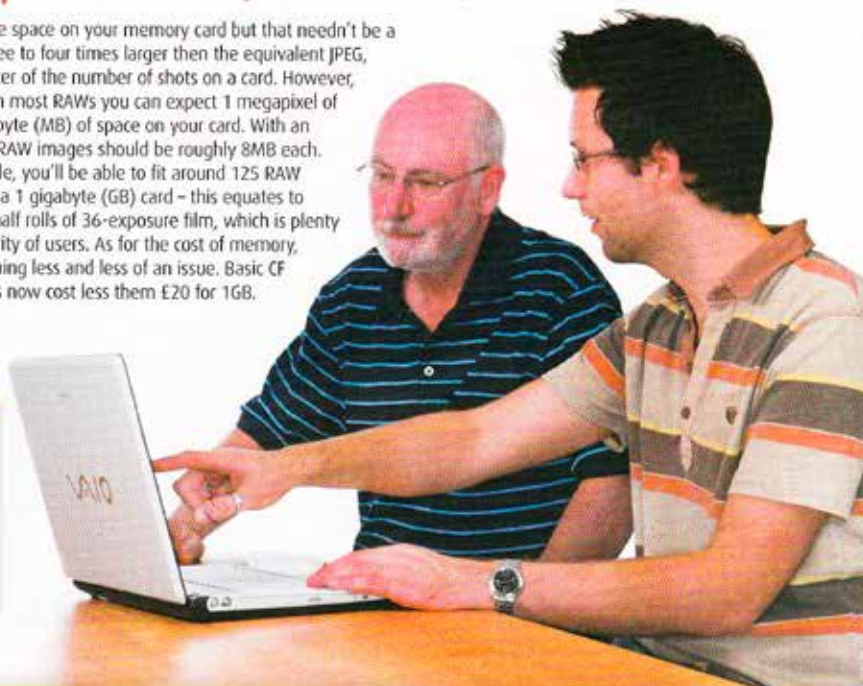
MYTH 4 — It's too complicated

When you're starting out there are a few new things that you'll have to learn, but within a few hours you should be up to speed and then things actually become easier and less complicated. The only extra step you need to master is using a RAW converter to open up pictures, make adjustments to them and export them as TIFFs or JPEGs. Once you've done that though, you'll find that basic corrections and enhancements are much simpler and quicker to make, compared to Photoshop.

MYTH 5 — Fine JPEGs are good enough for me

You're missing the point. It's not just a matter of ultimate image quality and clarity, it's also a matter of flexibility and creativity. RAWs give you the option to quickly enhance or manipulate many aspects of your photo to create the best-looking image. Marginally superior sharpness is just one of the many benefits.


MYTH 6 — They take ages to process – I want to enjoy my images now

You don't have to convert your RAWs before you can enjoy looking at them. Many Canon and Nikon RAWs can be previewed in Windows XP, much like a JPEG, without any additional software. But, all good RAW converters boast intuitive and fast picture management tools that allow you to browse and open your RAWs in a variety of different ways before you process them – you may even be able to watch a slide show of your favourites.

MYTH 8 — You don't need RAW if you get your shot right in-camera

That's a fair comment if you're only interested in representing your subjects 100% faithfully. However, if you have a more creative vision then you may find that the shot in your mind's eye is not actually in front of you to photograph. With film cameras we could use Fuji Velvia slide film to give strong colours, black & white film for dramatic mono shots, or even cross-process colour negative film to get all sorts of funky colour effects. With D-SLRs we can't change the film, but we can process our RAWs to create similar effects to give our straight shots more style.

If you want to capture a more creative vision then don't rely on JPEGs. Shoot RAW and take advantage of the controls in the RAW converter.
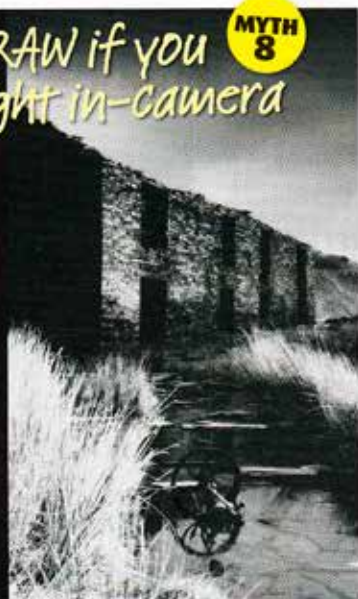
MYTH 7 — You need expensive software

It's true that you may need to install additional software on your computer, but it needn't be a costly experience. As there is no true standard for RAW files, every model of camera produces a unique RAW file format. This means that you'll need to install compatible software to extract the picture data and make sense of it – this is known as a RAW converter. Fortunately, all of the latest D-SLRs come bundled with their own RAW converter, so you needn't spend any extra cash.

There is a question of usability though. Canon, Olympus, and Sony D-SLRs come with pretty competent RAW converters which provide enough control for the majority of users, but it must be said that we've been less impressed by the bundled converters that come with most Pentax and Nikon cameras. In any case you may prefer to use a third-party converter that will handle RAW files from huge selection of cameras and also offer a bunch of different controls. Two attractive budget options are **CaptureOne LE** from PhaseOne and **Adobe Photoshop Elements 5**, with its simple built-in converter. Both options cost around £65, which is nothing if you consider the cost of camera kit.

RAWFACT

If you're a Nikon user and want the king of RAW converters, then check out the new Nikon Capture NX software, which carries a reasonably modest £120 price-tag and offers revolutionary new controls.

The RAWs look flat when I open them

MYTH 9

Unlike JPEGs, RAW files remain largely untouched by the camera's processor so they can look a bit flat and lifeless straight out of the camera. JPEGs are normally enhanced before being saved to the memory card to give the shots more impact. Flatness shouldn't be an issue though, because your RAW converter will give you plenty of options to make the RAWs as punchy, if not more punchy, than standard JPEGs. If you need to make identical adjustments to multiple images to beef them up, many converters give you the option of pasting the same RAW settings to many images at once to speed up your workflow.

CONVERTED RAW FILE

UNTOUCHED RAW FILE

RAW provides you with a flat starting point so you can choose to enhance the picture in any way you want to suit your style. Here we darkened the image and then boosted the contrast and saturation.

The results aren't true-to-life like JPEG

MYTH 10

This is a common misconception. Just because JPEGs come straight out of the camera without any user intervention, it doesn't mean they are as pure as you think. JPEGs are created from the RAW data, after the shot has been taken, by the camera's image processor. The white balance corrections are made, the colour saturation is often boosted along with the contrast and sharpness, and a multitude of other adjustments are made. The resulting image is compressed (losing some of the picture detail) and saved to the memory card as a JPEG. So RAWs aren't necessarily any less lifelike than JPEGs. What you're getting with JPEG is consistency, as the same adjustments are made to every shot you take. With RAWs you have the option of changing the contrast, saturation and so on to suit your image, so you can choose to make the shot realistic or unnatural – you are in control.
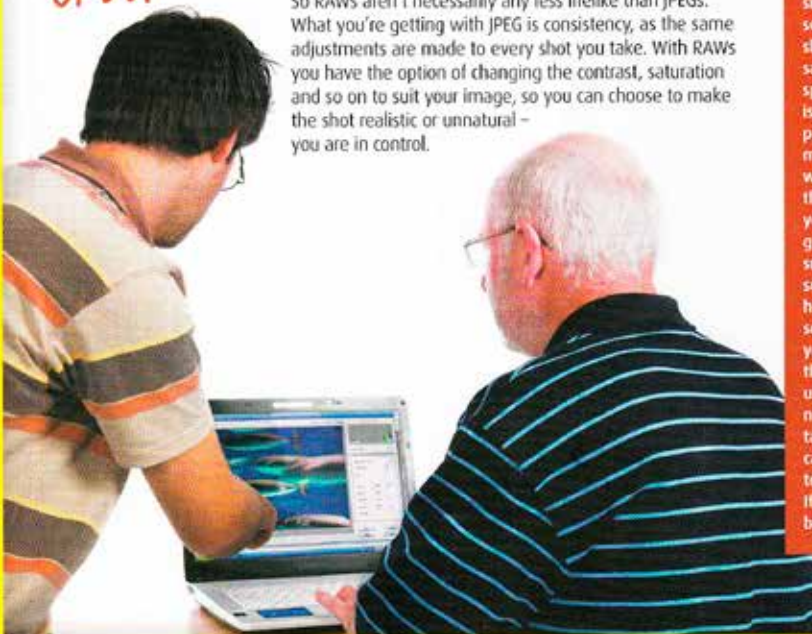
I might shoot RAW if I was shooting something important, but JPEG is fine for snaps

MYTH 11

If you're not spending time crafting serious shots then it may seem sensible to shoot JPEGs to save on card space. The thing is that RAW is probably even more useful when time is of the essence and you're quickly grabbing a few snaps. As we've seen, you don't have to be quite so critical with your white balance or exposure, so there's a greater chance of getting a usable image with RAW. Also, you can never be sure if the snap you've just taken is only a silly snap or a great candid family portrait that you're going to want to put on your wall for all to see. If you have the option, then it's best to be on the safe side and shoot RAW.

With RAW we were able to brighten this snapshot to create a pleasing family portrait.

ENHANCED FROM JPEG

ENHANCED FROM RAW

ORIGINAL PIC

JPEG 125%

RAW 125%

MYTH 14 The large files will clog up my hard drive

RAWs are bigger then JPEGs and will fill up your hard drive quicker. However, an external USB 2.0 hard drive is a simple and cost-effective solution. All you need to do is plug it into a USB port and it'll come up as a separate drive on your computer. Surprisingly, they cost as little as £85 for a massive 320GB of storage, which is around 40,000 8 megapixel RAWs – that's enough to keep even the most prolific snappers busy.

RAW: THE DOWNSIDES

So far we've only looked at the positive sides of RAW capture but there are some negative points too, which we feel are far outweighed by the positives. Have a look at this round-up and make up your own mind.

Large file size
RAWs are roughly three to four times bigger then JPEGs, so each shot takes up more memory card and hard drive space. This can be an issue with archiving and you'll probably want to use recordable DVDs rather then CDs to get lots on a disk.

They are heavy on the camera buffer
The larger RAW files take longer to write to a memory card. This means that the camera's buffer (memory) will fill up faster if you take lots of shots in rapid succession, and the camera may lock up temporarily. For sports photography this can be a problem.
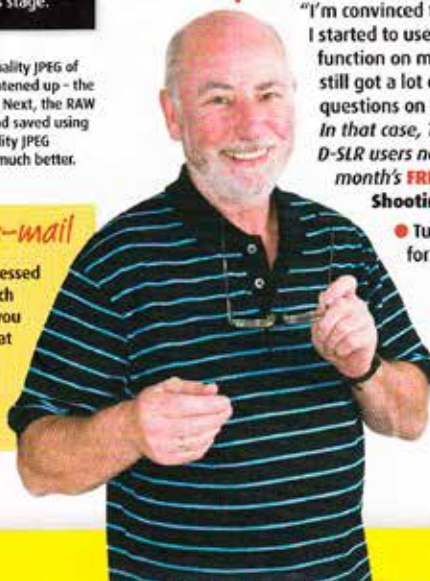
Converter compatibility
Every camera model produces a unique RAW file format, so finding software that opens them can be a problem. With third-party RAW converters you may have to wait a month before new camera models are supported. Upgrades are downloaded online and may require broadband.

Compatibility with other PCs
You may have set up your own PC to open every RAW file under the sun, but the files may not be supported by anyone else. They'll have to install your RAW converter software in order to view your RAW images.

MYTH 12 I'll convert RAWs to JPEGs anyway, so I might as well shoot JPEG in the first place

This is true if you're going to leave the image untouched, straight from the camera. However, if you're going to want to make any adjustments to it, subtle or extreme, then you're better off using RAW. Due to the lossy compression used to crunch down the size of JPEGs, some of the detail that is less obvious to the naked eye is discarded. This is fine as the image stands but if you make any adjustments to the JPEG, such as brightening the shadows, then the missing details may start to become more obvious (top left). If you create a JPEG from a RAW after you've made the corrections then you can rest assured that the missing details will remain hidden to the naked eye (top right).

RAWFACT

It's also important to remember that you'll lose image quality every time you open a JPEG file, edit it and save it as a JPEG again. With RAW you're cutting out this stage.

Top: First, a low-quality JPEG of this shot was brightened up – the detail is appalling. Next, the RAW was brightened and saved using the same low-quality JPEG settings – it looks much better.

Terry's verdict...

"I'm convinced that it's high time I started to use the RAW file function on my camera. But I've still got a lot of unanswered questions on how best to do it." *In that case, Terry and all other D-SLR users need to get next month's* **FREE GUIDE** *to* **Shooting RAW.**

● Turn to page 111 for more details...

They're too big to use on the web or e-mail

MYTH 13
RAW files are too large to e-mail and can't be used on a web page directly, but neither can fine quality JPEGs as they take an age to open into the web browser. In either case, you've got to resize the pictures. Most RAW converters give you the option to resize and save as compressed JPEGs ready to use. If batch processing is an option, you can resize many images at once. What's more, you still have a high-quality, high-resolution file for later use if needed. ■

SHOOTING RAW on your D-SLR
get the best quality & ultimate control

understanding
camera histograms
BY BECKY DANESE

Becky Danese explains how a fuller understanding of histograms can comprehensively assist your in-camera photography.

I've found over the years that there appears to be photographers who are born with the natural gift of having an eye for a photograph.

They 'see' the image before they have even taken it and provided they have a camera to hand, whatever they decide to capture has the innate ability to communicate a message, simple or complex. But whether gifted or not, there are some tools which can help every photographer to get it right in-camera as much as possible without spending laborious hours in front of a computer screen fixing up a photo to make it perfect.

One of these tools is the histogram. In this article I hope to outline the fundamentals of what it is and what it does, as well as how it can help you in your own photography.

What is a histogram?

This peculiar graph that sometimes shows up in your playback display tells you essentially whether you have exposed correctly or not, as well as whether or not you have sufficient tone and contrast in a scene. It is often helpful when checking your image during shooting to make sure that you haven't heavily under or over-exposed, which would result in loss of detail. The back screen of the camera can only give you an idea of your shot, but you might find when you get home and view the images on a computer screen that in fact you were incorrectly exposing. If you learn to read your histogram accurately, however, this can solve the problem in the field.

You will probably be aware that one has shadows and highlights in any scene. Although some of the information can be recovered in post-processing, if the blacks or whites are 'clipped' (so poorly exposed that the blacks are therefore completely jet-black or the whites are burnt out) this information isn't going to be saved even by editing.

How does this relate to the histogram? Well, the left-hand side of the histogram is dedicated to shadows (blacks) and darker tones. The middle shows your mid-tones. The right-hand side shows your highlights and white areas. The vertical axis is telling us how many pixels in the frame are affected by the graph.

There is an old rule of thumb: expose for the right (EFTR). This is a bit too broad a rule to be applicable to every form of photography, but for those who don't know it and sometimes have difficulty correctly exposing

> **▌▌** ... there are some tools which can help every photographer to get it right in-camera as much as possible without spending laborious hours in front of a computer screen fixing up a photo to make it perfect.

a scene it might be helpful. What EFTR means is that you use your lowest possible ISO and expose for the light portions of the scene to avoid a) clipping highlights and b) any excessive unwanted noise in the shadow areas.

However, I'm probably the first to admit that I do quite the opposite. For my commercial photography (often concerts, events and low-light work) the key subject is frequently the darkest thing in the room. Exposing for the right would not be helpful in this situation. So like all rules, to expose for the right is only as good as it can be useful to you and the message you are trying to convey.

Intentional under and over-exposing

You've probably done it a few times without even realising. Perhaps you are photographing a white flower and find that the sunlight is too harsh, so you deliberately under-expose. Or conversely, perhaps you would like to convey a dark and dusty room but the camera's auto-exposure causes it to be bright (which would result in the highlights being blown out due to the darkness of the rest of the scene). To get around this you might use the exposure compensation to dial the exposure down a little in spite of what the camera's meter is telling you. Images that are intentionally dark are usually called 'low-key' and images that are purposefully bright are called 'high-key' so these also play a part in how you expose your photograph. The trick is to use the histogram as a tool but not to get lost in the significance of it.

other. Assessing the histogram might take a bit of practice, but what you really want to know is if there is any unrecoverable loss of data on one side or the other of the graph.

How to view the histogram

In order to set up this function on your camera you will need to ensure that you have selected this in the Playback Menu of the camera.

For most cameras you will be able to activate the histogram by doing the following:

Reading histograms

So, we know what it is now, but how do we read it? You've probably seen the 'mountain ranges' that make up a histogram. If your histogram peaks at the far left, your shadows will be extremely dark, possibly causing some loss of detail in the blacks of the image. If your histogram has a high peak on the right-hand edge there are clipped highlights. If the peaks at either end are so great that they go off the end of the graph, this is where you'll get 'clipping' and it will be harder to recover the data in post-processing. The general idea is to keep the exposure in the middle and avoid having any clipping on the far-left edge or far-right edge of the graph.

What one is usually looking for is a steady rise from the left across the middle and back down again on the right-hand side of the graph. It's not always possible and if some data needs to be recovered later then so be it, but it helps to know immediately if you've lost information in the shadows or highlights and therefore need to adjust exposure.

If the majority of your subject is white or black though, then of course your histogram is going to be bunched up at one end of the graph or the

**MENU → PLAYBACK MENU →
PLAYBACK DISPLAY OPTIONS →
OVERVIEW (ensure that you tick
OVERVIEW** by highlighting it and
pressing the right-hand arrow before
exiting the menu).

When you then play back your
images you can use the UP and
DOWN arrows to toggle between
your standard display and your
overview display, which will show the
histogram on the right of your image.

Other histograms

You may have noticed different-looking histograms
when you look at your images in software afterwards.
These are called luminosity or luminance histograms
and refer to the brightness of colours as perceived by
the viewer.

There is also the option to view an RGB (Red, Green,
Blue) histogram on the back of the camera, enabled
in the same menu as mentioned above under **RGB
Histogram**. These too are a little more specialised as
they show you how much of each of these colours is
present in the image and by looking at these you can tell
if you have over-exposed any one particular colour and
by how much; i.e. one or more colours are too bright in
relation to the rest of the frame and so are blown out.

Overall the idea is to avoid the far-left and right edges of
the graph even with these colour histograms, but don't
let your worry of technical detail obscure the aesthetic
quality of the photograph. After all, beauty is in the eye
of the beholder. ■

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