

## Colour management – why ?

A digital image is made up of a huge bunch of numbers. Each point (a pixel) in the picture is represented by one number for the amount of red, one number for the amount of green and one number for the amount of blue at that point. The brighter each colour is at that point the higher the number used to represent it. The numbers are usually shown between 0 and 255 because it's a good compromise between the way computers work and how good humans are at distinguishing separate colours.

With three numbers for each point and most cameras having 10 to 20 million pixels nowadays it means that every time you push the shutter button your camera has to correctly work out the value of 30 to 60 million numbers and store them away before it can take the next shot, that's an awful lot to do in a split second !

A completely white point is represented by a maximum value of each of the three basic colours of light i.e. 255 red, 255 green, 255 blue, similarly a total black would be 0 red, 0 green and 0 blue. A mid grey would be 128 parts red, 128 parts green and 128 parts blue, other colours are represented with different proportions of red green and blue, e.g. a bright yellow would be around 245 red, 247 green and 6 blue, or a lavender colour would be around 166 red, 90 green and 179 blue.

Life would be simple if every camera, every computer, every scanner, every projector, and every printer showed us exactly the same colours and brightnesses when you gave them the same original set of numbers and asked them to present those numbers as a picture to you, the trouble is that they don't. Although they are digital devices they seem to behave in an analogue, almost human, way in that they show their opinion of what the correct colour and brightness is rather than what we want it to be !

What we want is consistency in the images no matter how it is displayed - which is what colour management does for us. By using a piece of equipment to calibrate each device in the imaging process we will get out exactly what we want rather than what the device initially wants to give us. It will mean that if we take our images from one correctly calibrated device to another they will always look the same with no colour bias problems, no burnt out highlights and no blocked up shadows – or at least without any faults that weren't there in the original !

## How does a calibration tool work ?

What the tool does is look at a selection of precisely defined colours from dark to light that have been generated from a known source. For a computer display/projector the source will be in the computer program itself, for a printer it will be a special document that you print from within Photoshop (other image manipulation programs are available !), for a scanner it will be from a specially printed sheet that must be stored inside a protective envelope so that it keeps its colour without any fading.

Once the calibration tool has looked at how your device displays the full range of colours it compares the result with how it expects those colours to look. The calibration program then works out how the device can be made to display the full range of colours so that they appear correct, it then creates a list of instructions to tell your computer how to do that for the device you are calibrating. These instructions are called a "profile" and your computer will know how to use them automatically once they have been created. You will need one profile for each display e.g. if you have a laptop that you plug into a larger screen then you will need one profile for the laptop's display and a second profile for the larger screen (and a third one if you use it with a projector). I recommend that you give each of your profiles a clear and simple name and include the date it was created so you can tell which device it is for and how old it is at a glance.

Usually the calibration tool will store a copy of the profile of each display device so that your computer will automatically use it whenever the device is plugged in. Profiles for prints are a little different as the computer can't tell what paper you have in the printer so you have to select the correct one from within Photoshop each time.

There are a range of colour calibration tools available at different prices. The cheapest at around £100 tend to only calibrate display screens rather than printers - Tristram has one of these that NHPS members can borrow at no charge - but if you take advantage of Fotospeed's print profiling service (other print profiling services are available) and only use their papers and always use the same ink then this is a perfectly reasonable solution. If you like to change brands of paper a lot it may well be worth your while investing in a calibration tool of around £300-400 so that you can profile not only your screen but also your printer to every type of paper that you use. There are also calibration tools that are in the £1,000 range but these aren't necessary for us ordinary mortals.