CLOSE UP AND MACRO PHOTOGRAPHY BY MICHAEL SMYTH AND JIM CREW

INTRODUCTION: WHAT IS MACRO PHOTOGRAPHY ?

Macro Photography is generally defined as a type of close up photography where the image obtained is at or greater than life size. A macro lens is defined as a lens capable of rendering images at 1:1 or greater. Macro lenses are lenses capable of focussing on objects that are very close to the sensor in order to be able to magnify their size.

Typically, a photograph is considered to be a macro photograph if the resulting image is reproduced at greater than life size, although this is a bit of a fluid concept. Close up photography is any form of photography where the image is taken from a very close distance to the subject, whether it is macro or not. Typically close up images reveal details about a subject that are not clearly visible to the naked eye.

TECHNIQUES

Macro and Close up photography requires the same skill set as for any other form of photography. Framing, composition and viewpoint are all important to present your subject in the way you visualised. Because we are working at close distances to our subjects, some special considerations are also necessary.

- **Camera Movement** (unintended): At close distances any camera movement is going to be magnified. In most cases you will want to work on a tripod. You will need a good firm tripod and a firm footing to avoid any unwanted movement. Using an extra weight such as a camera bag hung from the centre post will help stabilise your tripod.

- **Exposure:** is likely to be lengthy, especially when using small apertures. When using long exposures on a tripod do not use higher than normal ISO settings as you will add unwanted noise to the image data. Keep to the lowest (default) ISO setting. Take test exposures and check the Histogram.

- **Depth of Field:** Close focus results in very shallow depth of field, so to get as much of the image acceptably sharp you will need to use a small aperture. Do not use the minimum aperture setting for your lens as this typically results in a loss of sharpness called Diffraction. For best results on most lenses, do not shoot at the widest or smallest aperture. Use an aperture 1-2 stops either side of the maximum or minimum.

Left: Large Depth of Field

Right: Shallow depth of field

- **Plane of Focus:** Because of the shallow depth of field it is preferable to position the camera at the flattest angle to the subject, minimising the variation in distance from the lens and therefore keeping as much as possible acceptably sharp.

- **Use Selective focus for effect:** Where you do not need to keep the majority of the subject sharply defined, use different apertures for creative use of sharpness.

- **Mirror Up Mode:** Use mirror up or Live View mode to minimise camera shake prior to making the exposure. This raises the mirror prior to tripping the shutter. A delay of several seconds will allow any vibrations to settle before the shutter is released.

- **Cable release or Self Timer:** Use a cable release or the camera's self-timer to avoid inadvertent camera movement when firing the shutter. See Mirror up Mode above.

- **Lighting - Available Light:** Generally, for aesthetic reasons, using available light is preferable in most situations. Available light can be modified by the use of reflectors or light cutters (black surfaces) to reduce or eliminate reflections on your subject. To control harsh light, some diffusing material such as tracing paper or nylon curtaining can soften the light.

- **Lighting - Supplementary:** Use of on camera flash (at reduced power) as a fill in light source is often helpful, however take test shots to evaluate how much light is being provided by the flash - it should not be obvious. Often an on camera flash will be partially masked by the macro lens when you are very close to your subject, so check carefully. The use of a reflector and /or a diffuser in conjunction with supplementary flash is a good option.

- **Lighting - Supplementary Flash:** Using an add on flash unit raises the position of the light source to avoid the masking from on camera flash. Add on flash units can be used as a bounce source in conjunction with a reflector to add more natural looking lighting to the subject. Off camera flash can also be used to provide backlighting for translucent materials such as leaves and flowers, with the added advantage that the source of the light can be repositioned.

LENS CHOICE

Purpose made macro lenses have the ability to focus on subjects very close to the camera sensor plane. Macro lenses are generally a fixed focal length, however some lens manufacturers offer a semi macro capability on some zoom lenses.

A standard lens can be modified for use as a macro lens by adding an extension tube between the lens and the camera. This allows the lens to focus more closely, but usually prevents the lens from operating with Autofocus and camera aperture control.

Above: Extension tubes

Above: Close up lenses (Dioptre lenses)

Another option is to use a Dioptre or Close up lens over the front of the lens. These attach to the filter thread and act like a pair of glasses - they change in lens focus slightly to allow closer focusing. They need to be removed for normal use as they restrict focussing on distant objects. Some small loss of image sharpness may be experienced using these filters.

EXPOSURE

Exposure settings will be largely determined by the aperture choice. Using a tripod allows use of long exposure times without detriment to the image. As always check the Histogram and make adjustments to suit the subject.

USING SUPPLEMENTARY LIGHTING

Using on camera flash or supplementary flash, external lighting sources etc may introduce differing colour balance to your image. Flash units are balanced to daylight colour temperature, so if using flash in sheltered locations, such as inside a rain forest, the colour temperature of the ambient light and the flashlight may differ, giving unwanted colour casts.

If using an add on flash, it is preferable to use it off camera and synchronise by use of a cord or wireless setting (where available). Avoid using flash without a diffuser over the flash head as flash at close distances is very harsh. A good diffuser is a clean tissue (white) placed over the flash head. Alternatively, use the external flash as a bounce illuminator by firing it onto a white card. This acts like a large diffusing source and softens the light considerably.

REFLECTORS

There are purpose made reflectors available from photographic shops. These generally twist up into a compact size and come in white, silver and gold colours.

Above: Kit reflectors- from around $40 - $60.00

Above: Helping hands

An alternative is to use white polystyrene or white card, or even for field trips, a white plastic bag that can be folded and stored in your camera bag. They also double as a kneeling mat for wet or boggy conditions.

OTHER HELPFUL ITEMS

When photographing delicate flowers and plants, often they will wobble about in the breeze. It is often helpful to tie the stems to something solid (out of the picture) or use "Helping Hands" (available from craft and electronics stores) to hold your subject. Alternatively, some masking tape or string can help to tie offending bits of foliage out of the way. Last of all, do some selective "Gardening" to remove small bits and pieces from the background that might be distracting.

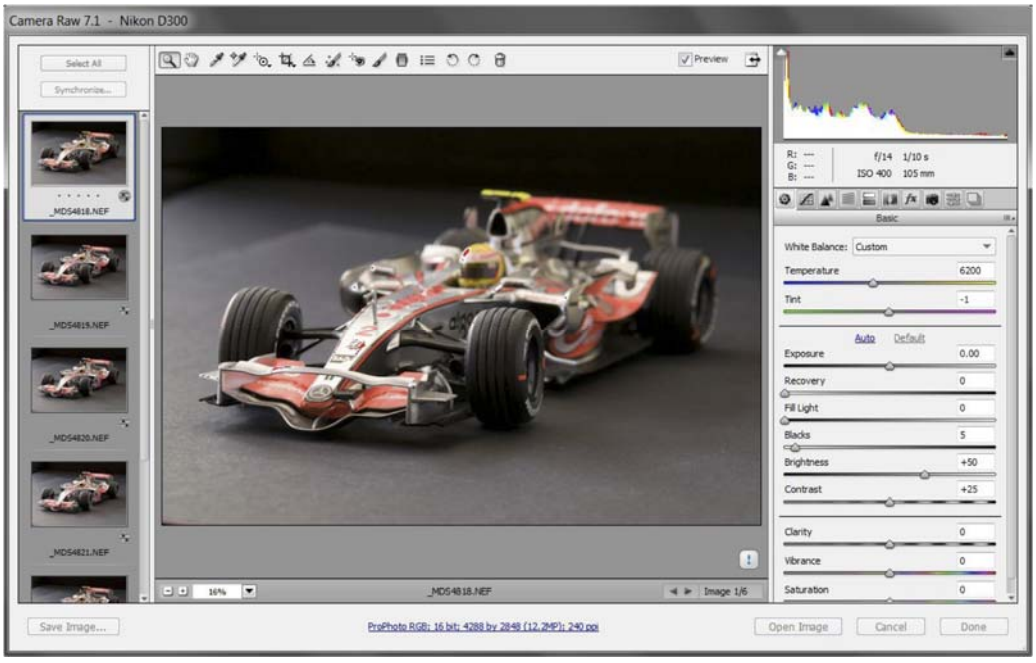
FOCUS STACKING IN PHOTOSHOP

Where it is not possible to obtain sharpness throughout a subject, a technique called "Focus Stacking" can be used. This uses several images taken from a tripod and with very slightly different focus points. You can blend together as many images as your computer will allow, often as many as 6 or more will suffice for complex subjects. (Note: this technique is not available in Elements).
To capture images for blending using Focus Stacking, follow these steps:

FOCUS STACKING STEP BY STEP

Set your camera up on a tripod and lock down securely. Set your camera to manual focus and carefully focus on either the closest point of your subject or the furthest. Set your aperture to the desired setting and using the aperture preview button on your camera, check to see how much of the subject will be sharp. If you don't have a depth of field preview, take a test shot and review on the screen on the back of the camera. From this you will be able to estimate how many "slices you will need to make in order to capture the subject in sharp relief from front to back.
Take a series of captures all at the same exposure (set exposure to manual) and after each capture adjust the focus slightly to move the focus point further away from the last capture. Repeat until you have enough captures to be able to overlap and form a sharp image. It is better to take more than you need than insufficient to make it work. After downloading, process all images with the same settings (in Lightroom process the first image and then use Copy and Paste settings or Synchronise the processing steps). The example we are using is of a small scale replica Formula 1 car. Some newer cameras allow automated focus stacking, which can save a lot of time and hassle.

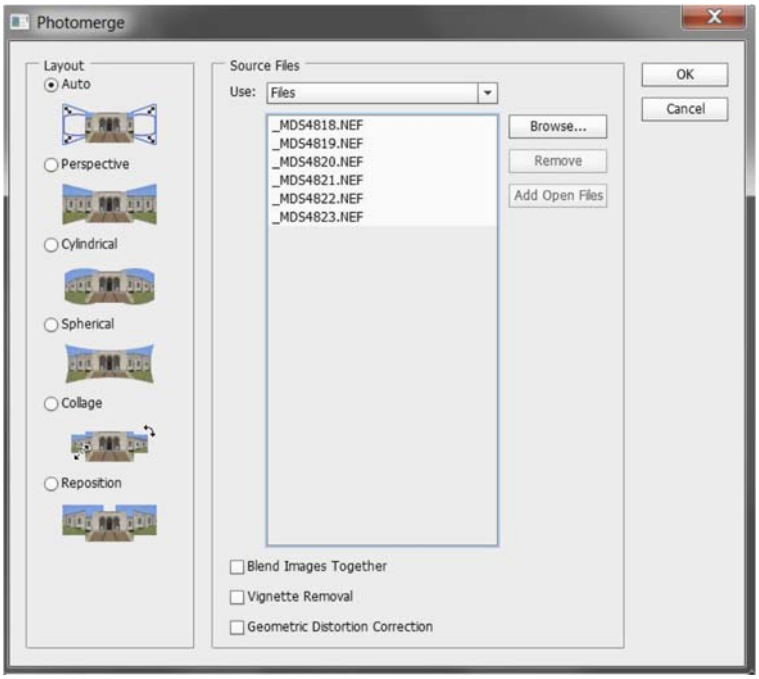
If working in Photoshop, open all images into Camera RAW and process the first one, then from the LH menu, choose "Select All" and then "Synchronise". When finished, click on "Done" to save the processing steps. See illustration below:



Above: Adobe Camera RAW multiple image processing

FOCUS STACKING STEP BY STEP continued

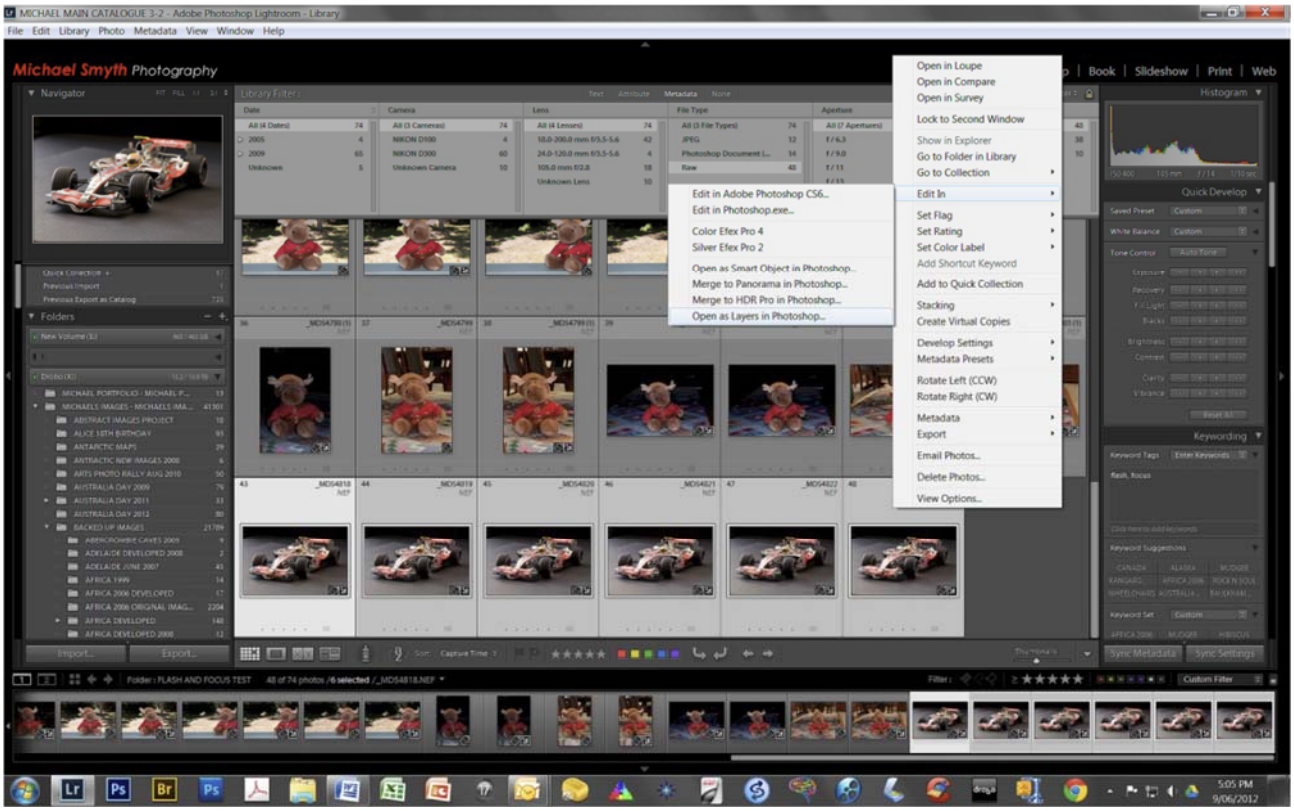
Next from the Photoshop main window, go to File>Automate>Photomerge.



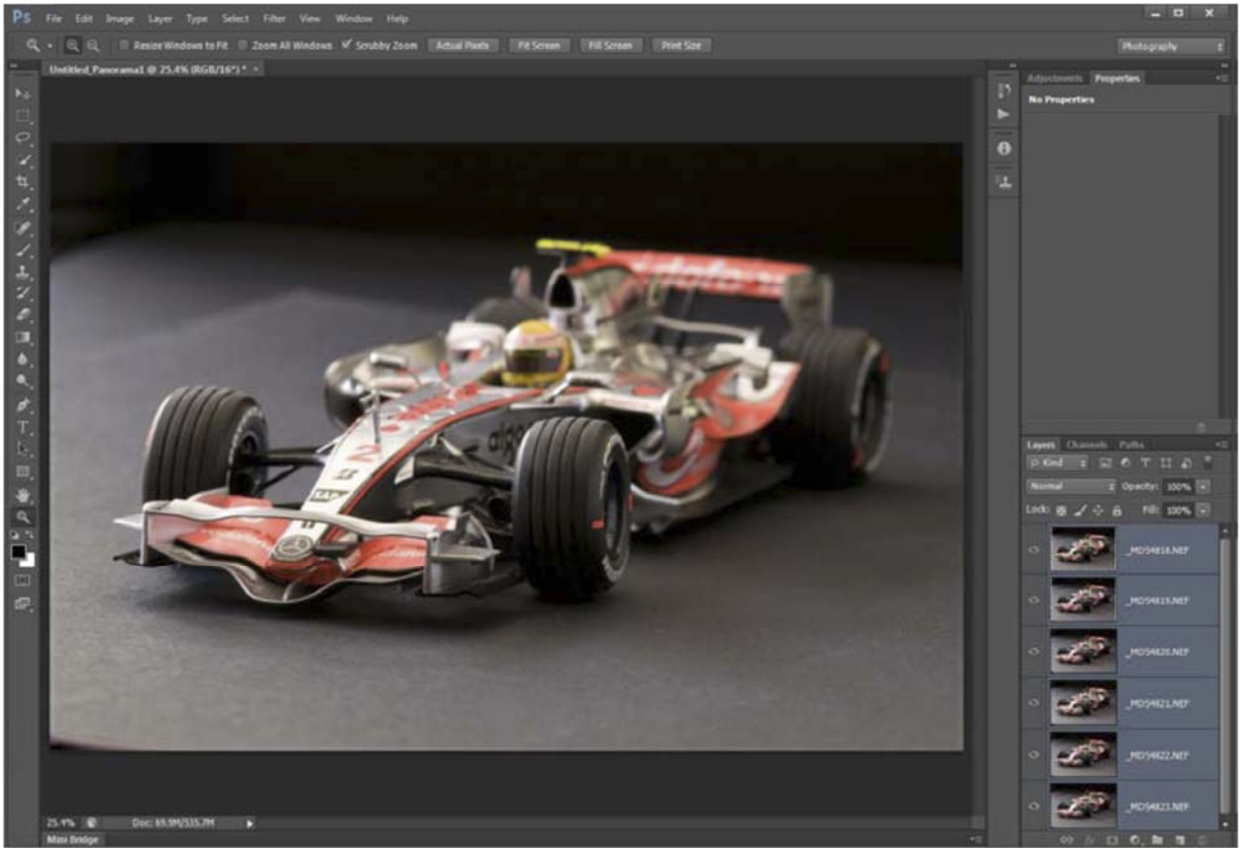
From the window that opens (This is the same window used for Panorama stitching) Select "**Auto**" for the Layout and **Un tick the box called "Blend Images together** (Most important !)
In the middle window, choose "Browse" and navigate to the location of your processed Raw files. Select all of the images you are going to blend; in the example I have 6 images.

When done, click on "OK" to open in Photoshop.

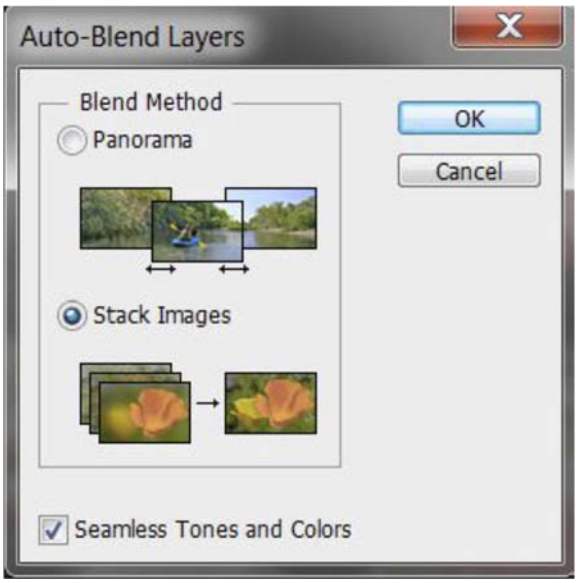
If working in Lightroom, click on the first image in your series, then hold down the Shift key(or the Control Key if the images are not consecutive) and select the last image. Then right mouse click and choose "Open as Layers in Photoshop" to open them as stacked layers in Photoshop.



Regardless of which method you choose, you will end up with a single image open in Photoshop that consists of several layers, each layer being one of the images you opened. Next, click on the top layer, then hold down the Shift key and select the bottom layer so that all layers are selected. Then go to **Edit>Auto Blend Layers.**



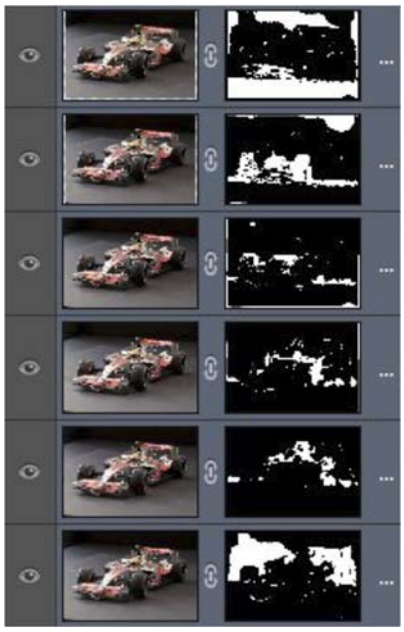
Above: All images open in Photoshop as layers, note top layer only visible.



After selecting "Auto Blend Layers" the menu at left opens. Choose "Stack Images" and tick the box marked "Seamless Tones and Colours".
Photoshop will now set about processing the images based on which part of each image is sharply focussed.

Note: depending on the power of your computer this may take some time. On computers with insufficient power or RAM you may get an error message. If this occurs, try again using 2 or 3 images only.

You can then repeat this several times to arrive at a full composite (Save each blended group after flattening and repeat with the composites)



Left: Layers with masks

The resulting masks will often be quite surprising, sometimes Photoshop makes mistakes with areas that are out of focus on all frames (such as the background in the example). This doesn't matter in this case, but if you have not captured enough overlapping sharply focused areas, you may end up with an odd composite.

To see the effect of the blending, try turning off layers one by one to see what has been registered as sharply focussed. When satisfied, flatten all layers and save. You can then continue with any selective editing on the image as you would with a single image.

Above: Final composite - compare with the stacked images.

In the example above, some final retouching to get rid of the background seams and some vignetting is all that is required. Note that the image is sharp from front to back

The most important part of the blending process is to ensure you have enough slices with overlapping zones of sharpness, if you don't, the resulting composite will have missing areas of soft focus.