

# Producing an Optimal Digital Image in PhotoShop (CS) GTCCC Tutorial

## *Background*

All digital images are stored in a square or rectangle of pixels.

The original image from your camera may have a size exceeding 3000 x 2000 pixels – the actual number varies depending upon the camera manufacturer and the settings you have set on your camera when taking the picture. In addition, you may have modified this size (perhaps by cropping) when manipulating the image in your editing software.

However, the size of an image projected by most digital projectors is *substantially smaller than this*. For the class of projector used in this competition, the native size of the image is 1400x1050 pixels – which is a rectangle with a ratio of 4 :: 3. When a digital image measuring exactly 1400x1050 (or smaller) pixels is sent to the projector, the image is displayed pixel to pixel (or 1 :: 1) and it faithfully reflects the pixels in your image. If a larger image is sent, then either the projecting software, the computer's operating system or the projector itself must *scale* the image proportionally down to this size. While this *works* and the image is not proportionally distorted, this *on-the-fly scaling* is often not optimal and the resulting, projected image will be of lower quality than if you did this yourself, carefully, with your image editing software. Images scaled by the projector may be softer, have lower contrast or exhibit annoying pixelization compared to the image you carefully craft on your monitor.

Therefore, in a competition of this class, it is to your benefit to control the quality of the images in your editing software and produce an image that the projector can optimally handle.

For the purposes of projection in this competition, you have a 1024 x 1024 pixel *playing field* in which to project your image. If your original image is larger than that (as it most surely will be), then you need to reduce it effectively to within these boundaries.

When projected, any image that has a smaller dimension than 1024x1024 will have that area padded with **black**. *If you do submit an image larger than 1024x1024 (or with any dimension larger than 1024), it will be disqualified from competition.*

Since this 1024 square image is, in fact square, you are free to use the space in any way you wish. If your image is primarily horizontal in format and originally came from a camera with a 3 :: 2 aspect ratio, then your resulting image should be proportionally sized to 1024x683; where the 683 is the vertical dimension. For a similar image with a vertical orientation, the size would be 683 wide x 1024 tall. Consequently, within these boundaries horizontal images are not given more display space than vertical images. Maintaining the same space availability for horizontal vs vertical images was considered an important technical goal for this competition.

In the future, as technology and cost effectiveness continue to improve, the size of the *pixel playing field* will undoubtedly increase.

The procedure to downscale your images in your image editing software is straightforward. The basic workflow is to save your original image; and produce a smaller copy for submission. In a nutshell, the correct order of operations is to flatten any image layers; convert the image to the sRGB colour space; reduce the size of the image to fit within 1024x1024; reduce the mode to 8 bits (if you have been working in 16-bit mode); sharpen this version of the image when viewed on the screen at its final size; and save the image at the highest-quality JPG setting. This order of operations will produce an image with a superior projected quality compared to letting the display software do it *on the fly*. Most importantly, you will sharpen your submitted copy of the image (as opposed to your original master), as the second-to-last step and at the resolution at which it will be judged – and consequently you can be sure the projector is not modifying the degree of sharpness you set with your editing software. What you craft is what the judges will see.

## *Detailed Steps*

Follow these steps to produce an optimal digital image for submitting to the Competition. You should make and save these changes to a *separate copy* of your master digital file to avoid altering your original, large resolution file. These instructions apply to PhotoShop; very similar instructions apply to *Photoshop Elements*.

- **Save your current image as a master file.** This Save will be in the PSD or TIF format and represents your final PhotoShop editing at your highest resolution mode. *Now you will optimally reduce the image – but this image will only be used for submission on CD to the Competition. If you need to go back and further edit your photo, you will do it from your high resolution master copy.*
- **Flatten your Image.** There is no need to have PhotoShop layers after this point – so we will manually flatten the image to eliminate them.  
PhotoShop Menu  
[Layer | Flatten Image](#)
- **Change the embedded color profile\*.** PhotoShop Menu  
[Edit | Convert to Profile](#)

In the drop down box “[Destination Space](#)” choose “sRGB IEC61966-2.1”

In the “[Conversion Options](#)”, set Engine: Microsoft ICM  
set Intent: Perceptual<sup>note</sup>

Click [OK]

*\*This step may not be necessary on your system, especially if you are working only with JPEG files. You might find you are already in the sRGB color space – which is optimal for web uploading and display. If working with RAW files, you might be in the “Adobe 1998” or “ProPhoto” color spaces and you should change to the sRGB space for optimal display on Windows monitors.*

*Note: other Intent options exist including Relative Colorimetric and Absolute Colorimetric. While Perceptual will most often provide the best result, there’s no harm in trying the others and seeing if the result is more to your liking. It will depend on the colours in your image. For more information, you can Google “Rendering Intent”.*

- **Resample the Image.**

PhotoShop Menu

[Image](#) | [Image Size](#)

Tick each of the boxes as shown

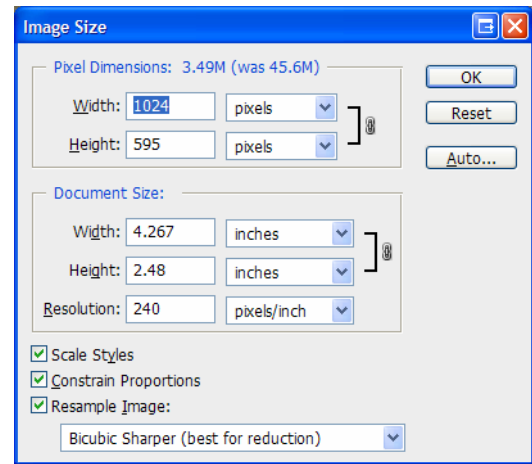
Enter a value for either the Width or Height (the other will follow

proportionally) so that the image is w1024 x h1024 or smaller. *(In the above example, the 595 was the maker's crop ... yours will likely be different.)*

Don't change anything in the "Document Size" or Resolution boxes-leave them alone.

Change the drop down to "**Bicubic Sharper (best for reduction)**"

Click [OK]



- **Change the Mode to 8-bits per channel.** PhotoShop Menu

[Image](#) | [Mode](#) |  8 Bits/Channel |  RGB Color

*Note: tick both RGB and 8 Bits/Channel at this step*

- **Sharpen The Image.** This step, referred to as Output Sharpening, is optional. You may wish to use the Sharpen Tools (most likely the Smart Sharpen or Unsharp Mask filter) to improve the look of your image. Complete this step with your zoom at Actual Pixels so you can clearly see the effect of the sharpening filter. Don't overdo it! If you sharpen too much and introduce "jaggies", artifacts, sparkles or your image looks overly "crisp", you can reverse the step using ctrl-Z (or backing up on the history palette) and repeating the action. You should not sharpen an already sharpened image or it will worsen the artifacts. Each picture is different so you will have to experiment with the sliders

for the best results. As a starting point, try setting the Radius slider to 1.0 and increasing the Amount slider until you visibly see the artifacts, then back off the Amount slider a bit. There are many Internet Tutorials on how best to sharpen. If you simply Google “photoshop sharpen” you will be able to explore a wealth of material.

Save the image. Photoshop Menu

File | Save AS

From the Format drop down, choose JPEG\*.

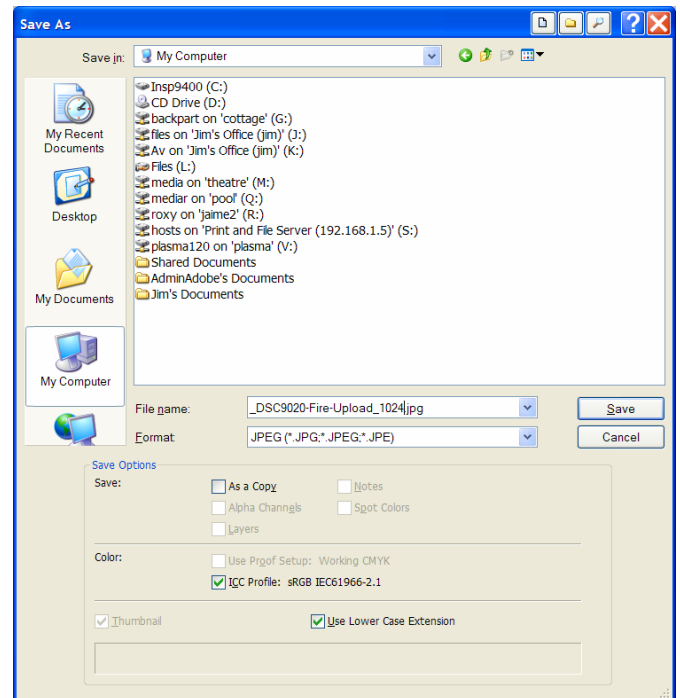
In the File name box, provide a filename. You should add a phrase like “Upload\_1024” to help you identify the file and ensure it does not unintentionally overwrite an image.

Click [Save]. Photoshop will pop up the JPEG Options box, adjust the Quality to High or Maximum (10-12).

Click [OK] to complete the Save.

You should then close this file and not use it for subsequent editing as it has been substantially reduced in size from your master original.

*\*If you do not see JPEG as a Format option, it means you have not reduced the mode to 8 Bits/Channel in the fourth step. JPEG images must be 8 Bits/Channel.*



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