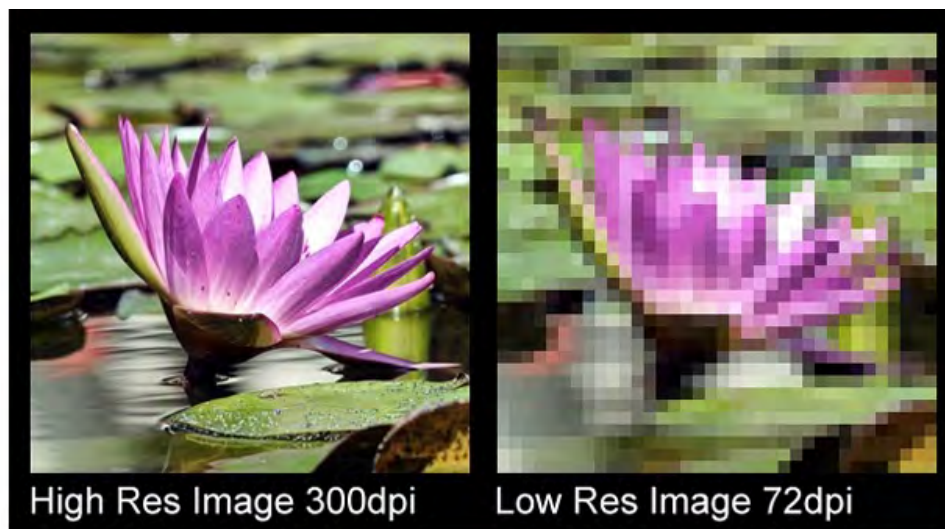


Checking the Resolution of Images for Submission to IEEE Magazines

IEEE magazines require that all images submitted for production possess a resolution of at least 300 dots per inch (dpi) at an acceptable size required for publication (see “Minimum pixel dimensions required” section for details on size requirements). In addition to resolution, pixel dimensions should also be taken into account, with images containing a minimum dimension of 1200 pixels x 1800 pixels. This resolution and the proper pixel dimensions ensure that the files (and any text contained within) will be reproduced as sharp, high-quality images in the print version of the magazine. Images can include file types such as .jpg, .gif, .tif, or .eps.

What is resolution?

A high-res image is composed of thousands of pixels—each one is a distinct unit of color information. A low-res image has much less density; so when it’s enlarged for print, the printer has to guess at most of that information, filling in the gaps in density with what it assumes are the right colors. The result is a blurry image with little detail.



When taking pictures, digital cameras will list images in terms of total number of pixels (e.g., 1290 x 960, with the first number representing the width and the second number the height). You can find out the actual size of the image based on the dpi. At 72 dpi, the image would be 18” x 13”. But if you want to print this same image at a high resolution (300 dpi), you will need to decrease the dimensions of the image by approximately 24% of its original size (since 72 dpi is about 24% of 300 dpi). As a result, this image in a high-resolution version is only 4 inches x 3 inches.

When you are taking a picture, ensure that your camera is set at the highest resolution. It is easier to scale down the size of a high-resolution image and retain a high quality than to increase the size of a low-resolution image. All images contain a finite number of pixels, and smaller, low-resolution images have less pixels than larger, high-resolution images. When attempting to boost the size of an image, the pixels are increased in size (or are stretched), which causes the blurriness or “noise” in images that are low in resolution and pixel dimension. Also keep in mind that even if you have a high-resolution image, if the image is pixelated or blurry, it will still print that way. Increasing the resolution of a blurry picture will not make the picture become clearer.



An example of a blurry, 300 dpi, 4-inch x 6-inch image. The photograph was not shot in focus; therefore, the image cannot be published.



An example of a crisp, 300 dpi, 4-inch x 6-inch image that is ideal for a print publication.

Pixel dimension: What does it mean?

The pixel dimensions contain the most accurate information on an image's level of detail. The pixel width/resolution (in dpi) and the pixel height/resolution (dpi) = the size of an image. For example, if you have a 300-dpi image with a pixel width of 1800 and a pixel height of 2400, the image is 6 inches x 8 inches.

Minimum pixel dimensions required

Here are the minimum dimensions at 300 dpi needed to reproduce quality images in a magazine:

1. For a quarter-page image or less: 1200 pixels x 1800 pixels (4 inches x 6 inches)
2. Between a quarter page and half page: 1800 pixels x 2400 pixels (6 inches x 8 inches)
3. Between a half page and a full page: 2400 pixels x 3300 pixels. (8 inches x 11 inches).

Exceeding the pixel count and resolution is perfectly acceptable. The higher the resolution and the larger the dimensions, the more detail contained in the image.

How to check the resolution and pixel count of an image

There are various tools available to check the resolution and pixel count of an image. The tools can vary depending on whether you are using a PC or a Mac but here are the three easiest (and most well-known) methods for checking the size and resolution of an image.

For PCs:

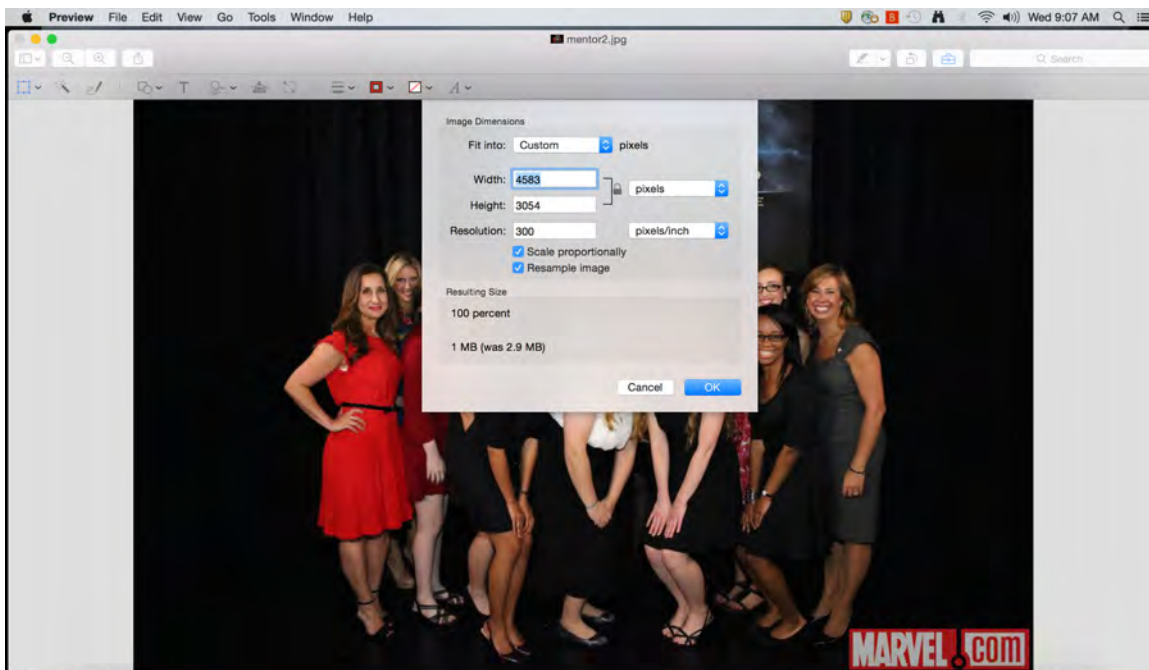
- Right-click on the file in Windows
- Click on "Properties"
- Click on "Details"
- The image's dimensions and resolution are listed under "Images"



Screenshot of image resolution details using a PC.

For Macs:

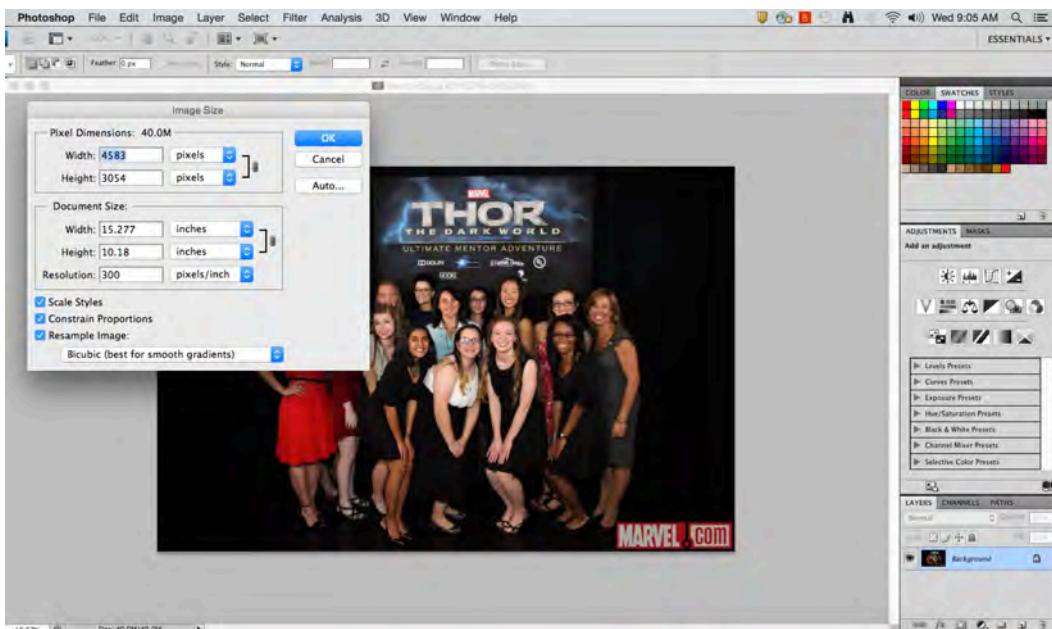
- Double-click on the image file to open it in Preview.
- Select “Tools” from the top menu
- Choose “Adjust Size” from the drop-down menu.
- The image’s dimensions and resolutions will be listed.



Screenshot of image resolution details using the Finder application on a Mac.

Using Adobe Photoshop

- Open the file in Photoshop.
- Choose “Image” from the top menu.
- Select “Image Size” from the drop-down menu.
- The image’s dimensions and resolutions will be listed.



Screenshot of image resolution details using Adobe Photoshop on a Mac.

Checking image resolution prior to manuscript submission

Checking the resolution of all of your images prior to submission will help to avoid any delays in the production process. Along with checking the resolution, also ensure that image captions and the proper permissions from the original sources (if an image is being reprinted) are included.

References:

K. Argenio. (2013, Mar. 20). Image resolution tips for non-designers: High-res, low-rs and everything else you need to know, Ideal Design Co. [Online]. Available: <http://www.idealdesignco.com/2013/03/20/image-resolution-tips-for-non-designers-high-res-low-res-and-everything-else-you-need-to-know/>

Contemporary Communications, Inc. (2012, Feb. 12). High resolution images vs. low resolution images: A short primer for beginners. [Online]. Available: <http://ccideas.com/chatter/high-resolution-images-vs-low-resolution-images-a-short-primer-for-beginners/>