DTC201: Tools & Methods for Digital Technology
Image Resolution Tutorial
5 points
Due next class

Read these pages, follow the instructions, and bring the files and prints you generate for next time:

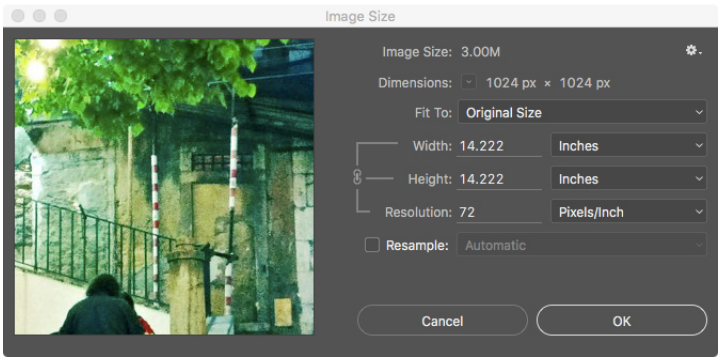
Download the images provided on our class website under the image-res-demo link on the Project 1: Digital Comics page. Unzip the folder and keep it on your class thumb drive.

Open the program Adobe Photoshop.

Open the file "`restaurant-exterior-night.jpg`"

(Arrange your workspace so Layers panel is visible on right, Tools on left)

Go to `Image > Image Size...` to open the Image Size dialog box. It will look something like this. Uncheck the Resample box if needed to make yours look just like this:



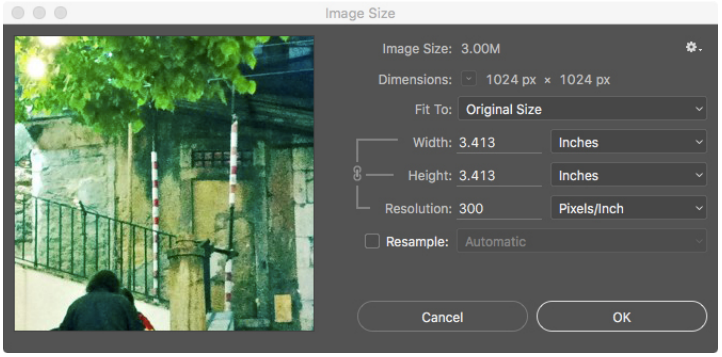
Note that the current **pixel dimensions** are 1024 pixels x 1024 pixels. This means the picture consists of a total of 1,048,576 pixels (1024 x 1024 = 1,048,576).

Also note that the **image resolution** is set at 72 pixels per inch, allowing for **print dimensions** of 14.222 inches x 14.222 inches. Each square inch of the image consists of 5,184 pixels of varying colors and values (72 x 72 = 5,184). 72 ppi is appropriate for screen viewing, but it is not a desirable resolution for printing.

Let's see what it looks like if we print at this resolution on 8.5x11-inch paper (The image is bigger than the paper so it will be cropped. That's ok.):

Hit cancel to exit the **Image Size** dialog box. Then choose `File > Print`, leaving the paper size at 8.5x11 and choosing the Avery 103 color printer before you click the `Print` button. Go get your print, write **your name** on it, and label it **72ppi**.

Back at your computer open the Image Size dialog box again, `Image > Image Size...` Note again that the **Resample** box is *unchecked*. Leaving this box unchecked, change the **image resolution** to 300 ppi. Now the Image Size dialog box looks like this:



What changed? The **pixel dimensions** are still 1024 x 1024 because you did not choose to **resample** the image. However, the **print dimensions** are now 3.413 x 3.413 inches. Why are they so much smaller? Because now each square inch contains 90,000 pixels (300 x 300 = 90,000). You are starting with the same number of pixels (1024 x 1024) but you are cramming them into a smaller space: The pixels themselves must become smaller. This is desirable because more pixels per inch will improve print quality, making the tones and colors of the image appear smooth and seamless because the pixels are so much smaller. You don't want your viewer to think about or see the pixels!

Let's see what it looks like if we print at 300ppi on 8.5x11-inch paper (Now the image will be much smaller than your sheet of paper):

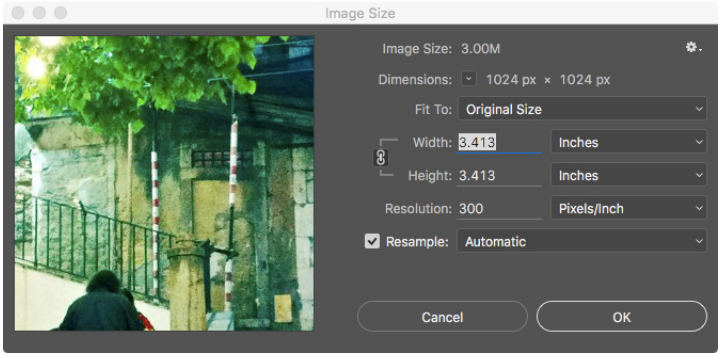
Hit cancel to exit the **Image Size** dialog box. Then choose `File > Print`, leaving the paper size at 8.5x11 and choosing the Avery 103 color printer before you click the `Print` button. Go get your print, write **your name** on it, and label it **300ppi**.

At 300 ppi the printed picture should look sharp:

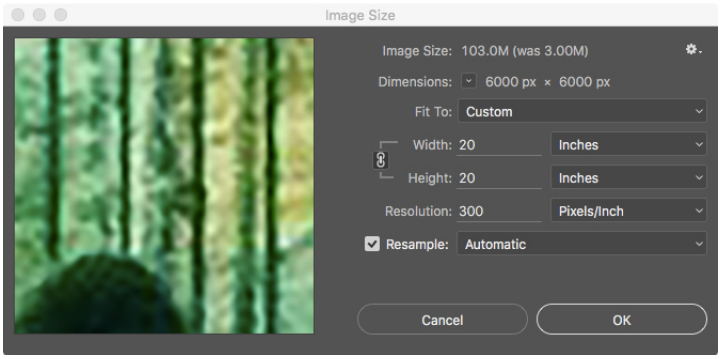
In the 72ppi print, you have a larger output size in terms of width and height, but you will start to lose image quality:

So what do you do if you need to print this image at high quality at a size that is larger than 3.413 inches x 3.413 inches? Answer: Travel to Portugal where this image was taken and take a new photo with a better digital camera. Or, better yet, contact the photographer, who posted the image on flickr.com with a creative commons attribution license, and see if he will share a larger version of the image.

Why can't I just resample the image and make it bigger? It is possible to do this—and you will indeed sometimes resample images using the Image Size function in order to make images *smaller* by throwing away pixels—but it undesirable to use Resample to make images bigger. Let's take a look at the Image Size dialog box one more time. This time check the box in front of the Resample option so it looks like this:



How does the box look different from before? Note that the Width and Height options are still linked (represented by the icon that looks like a chain link) to one another so that the **print dimensions** are resized **proportionately** if you change one of these options. However, the **image resolution** option is no longer linked to these measurements as it was before. Now you can do this, forcing the image to be 20 inches x 20 inches:

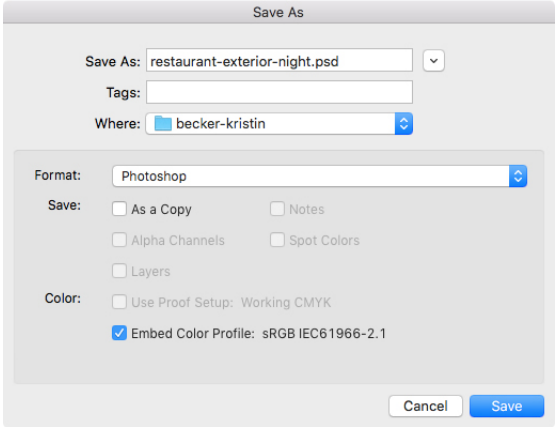


I am asking Photoshop to print the image at 20 inches x 20 inches with an image resolution of 300ppi. This means I am asking the computer to invent lots of new pixels to accommodate my request. Look at the new **Pixel Dimensions** at the top of the dialog box: 6000 x 6000 = 36,000,000! That is 34,951,424 more pixels than I started with (I started with 1024 x 1024 = 1,048,576 and 36,000,000 – 1,048,576 = 34,951,424). Photoshop does not do a great job of inventing pixels, as you can see in the preview window of the dialog box above: The image looks soft but also blocky. This is why you should avoid using Resample to invent pixels.

Don't print this time. Instead, with the **Image Size** dialog box still open, hold down the **alt** or the **option** key. Note that the **Cancel** button turns into a **Reset** button. Click **Reset** to return to your previous setting: 3.413 inches x 3.413 inches at 300ppi. Click **OK**.

Now save your 300ppi image as a Photoshop file (The image you opened, `"restaurant-exterior-night.jpg"` is a jpeg file, which means some image info has been compressed to make the file smaller.) You should always save the files you are working on as Photoshop files. Also, preserve the original copies just as they were provided or downloaded:

Go to **File > Save As** to open the **Save As** dialog box. Make a new folder on your thumbdrive called `"yourlastname-yourfirstname"` and save the image in this folder as a Photoshop file. This means choosing **Photoshop** under the **Format** option at the bottom of the dialog box:



Click **Save** when you're ready. You don't need to change the name of the file. It will be called "`restaurant-exterior-night.psd`" . When you save an image using a different file format, it automatically saves as a copy. Besides, you are putting this file in a new folder.

Now, choose, four *additional* images from the folder you unzipped that you would like to use to make a test image sequence for the short story "The Gray Man" by Savannah Jarrett. (This is just an exercise: You will get to choose which story you want to work with for the long term next week.)

Open each of these images in Photoshop, and check their **Image Size**. Change the **Resolution** to **300ppi** for each one, making sure the **Resample** box is *unchecked*. Then save each image as a Photoshop file in the "`yourlastname-yourfirstname`" folder on your thumbdrive.

Also print each one to the Avery 103 Color printer, labeling with **300ppi** and **Your Name**. You are looking to see how large you can print each image. This will also tell you how much room you may have to crop the image for use in an image sequence.

Bring all six prints you generate to the next class, as well as the five files you just saved on your thumbdrive. We will work together on image adjustments, cropping, and layering, and your instructor will explain the final tutorial file you will work on for next week. This final file will be due Tuesday, 9/6.