How to merge levels of focus In Photoshop
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A vexing problem for people who try to photograph cytologic preparations is that wonderful slide with tremendous features that are not in the same plane of focus. One can take multiple images and try to display them one after another, but it is not as good as one inclusive information-full image. Adobe has developed a tool in Photoshop® that can remedy the problem. It's called "Auto-Blend". Auto-Blend allows a user to take images acquired from different plans of focus, add them to different "layers" of an image and blend the portions of the images that are in the sharpest focus and have the most prominent edges.

It must be understood that Photoshop and many other image-editing programs have a facility called "layers". A layer facility allows you to merge things, to change opacities, and to perform manipulations on parts of an image. Ultimately, layers are images laid on top of one another, and can be likened to having separate images on sheets of transparent film, but in this case they are pieces of electronic film. A user may merge different objects within one image or one may merge images with different levels of opacity. Photoshop assigns every image a set of layers, of course, for most images there is just one layer.

There are books devoted to manipulation of these layers but will concentrate only on the one manipulation "Auto-blend."

To use Photoshop Auto-blend:

First of course you must acquire the images. They should be of the same size and they should be of similar registration. By "registration" what is meant is that the images must cover the same area[*]. This is usually achieved by taking one image, adjusting only the focus and snapping the next image. The Auto-Blend feature can accommodate numerous planes of focus, not just two, but until one gets used to it... start small. Use only a couple of planes. I would also recommend that you leave color balancing and any image manipulation such as sharpening until after you've done the blend.

Ok, now we have two separate image files. Take one of the images and go to the menu item called "Window" and open layers (or use the F7 key). This window will appear.


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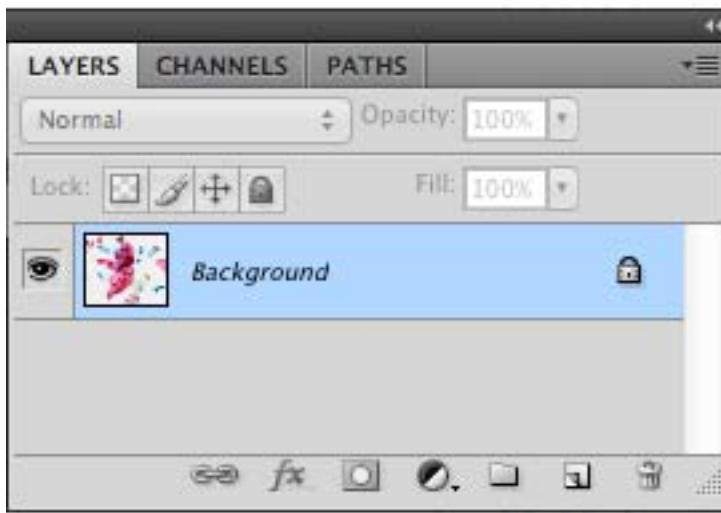
[*] Photoshop® could fix somewhat dissimilar registrations by another tool called "Auto-align" , but that would add another layer of complications to this procedure.

Click on the icon at the bottom of the window next to the trashcan that looks like a page with the lower left corner turned up. This will create a new layer.
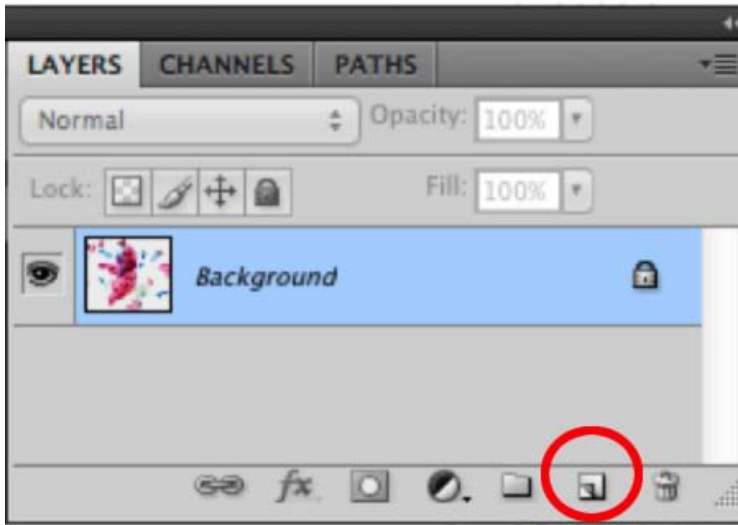
The image below shows a duplicated layer. The same action can be performed by 1) going to the top Photoshop ® menu selecting "Layer>New>layer" or 2) Shift-Command-N on a Mac, Ctrl-Command-N on a Window's Machine.
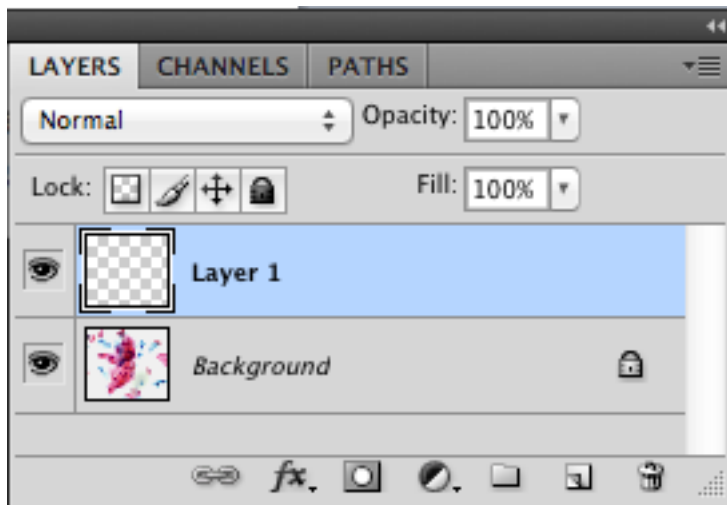
Next one must go the second acquired image. Copy the whole image. Command A on a Mac or Control A on a PC will do it... Go back to the image with the duplicated layer. Paste the copied image into the blank layer, by selecting the new blank layer and typing Command P on a Mac or Control P on a PC in

Then select both layers by clicking on each layer while holding down the shift key. Next go to the Menu and click on Edit>Auto-Blend Layers and the program will take over... After a short period of calculation the blending will be done and blending of the image from all planes of calculation will be done. To finish, the layers should be merged by hitting Command E on a Mac or Control E

on a PC and you are done.

Before the final merge, the user can open and close the layers to see what has occurred. The user can observe that each of the layers contributes in focus portions to the final image.

Thereafter, of course, you should save the image. Afterwards, a user can perform other manipulations such a color balancing or additional sharpening.

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