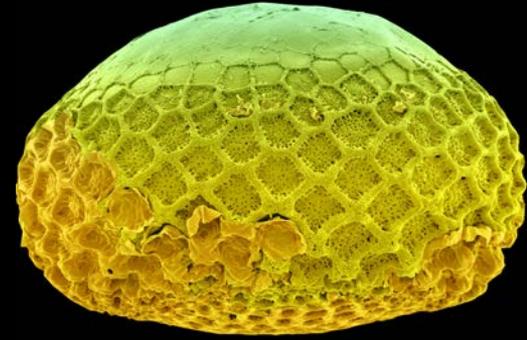


Colored SEM images

You'll know by now that the scanning electron microscope only gives you images in shades of grey.

But – a lot of the SEM images you see in books and on the internet are coloured – like these. This is because people add colour after the images are captured.

Why do you think they do this?



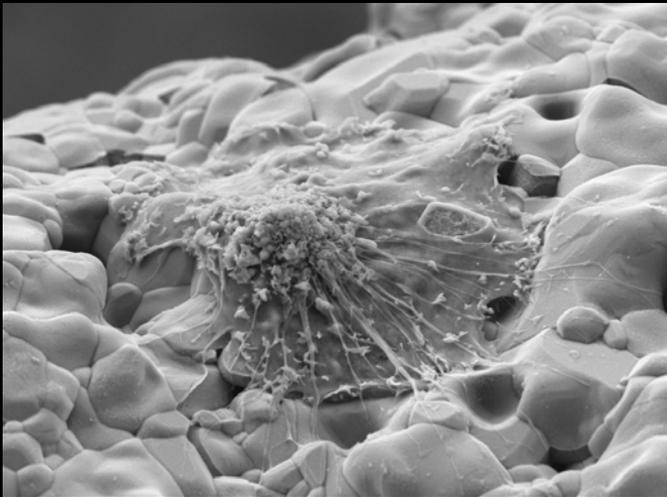
Why color SEM images?

Some reasons why SEM images are colored:

- it makes them more eye-catching
- they look more realistic
- color can help us distinguish the different things in the image.

You can color an image in any way you want, just like in a coloring book.

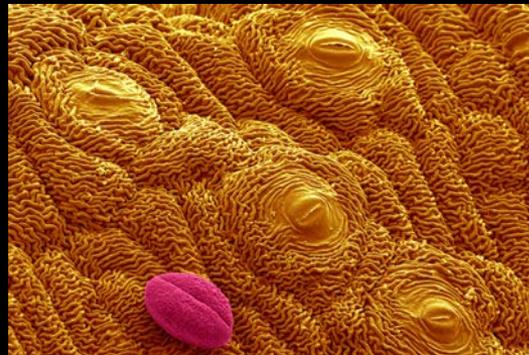
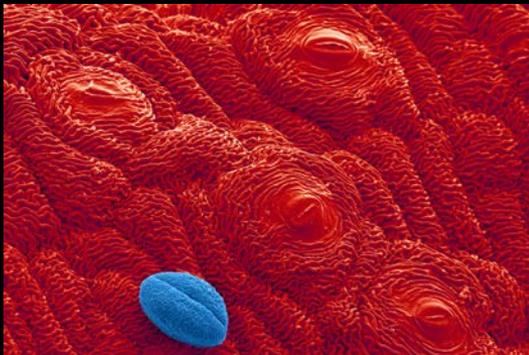
But – if you want to make it look realistic, or highlight different parts of the sample to make it clearer, there are a few things to think about.



Cell growing on a new bone repair ceramic

What colors do you choose?

1. Does the sample have a natural color that people are familiar with and would expect to see?
Example – most leaves are green, blood is red
2. Would it be confusing to use different colors?
Example – do you think it would help understanding to color leaves pink and petals green?
3. There are cultural associations around some colors that you should think about.
Example - pink for girls and blue for boys. Can you think of any others?
4. By choosing particular colors are you helping or confusing the people looking at the image?



What is this?

Pollen on a grass leaf

Coloring for clarity



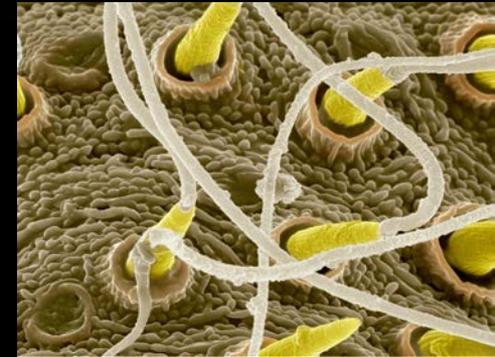
How can colors help distinguish different parts of the image?

1. if the sample is made of just one material, like salt, does it make sense to color each crystal a different color?
2. if there are different things in the image, think about how to group and color similar things the same color.

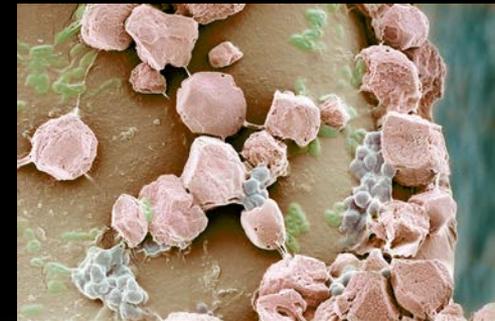
Example – you could color both an insect's antennae one color and all the legs a different color to help show which are which.

3. if you are coloring an image to help communicate a concept, think about how color can help and not confuse people.

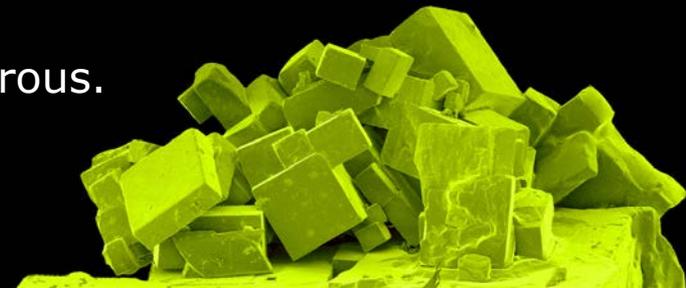
Example: you could color poisonous hairs on a caterpillar red to emphasize that they are dangerous.



Spider spinnerets making silk



Crystals & microbes on sponge



Salt crystals

Digital coloring tips 1

There are many ways to color SEM images. We use Photoshop but you can use programs like GIMP or similar apps.

If you have access to one of these programs and want to have a go, here are a few tips to get you started. Once you get some experience the possibilities are endless.

1. Save a copy of the image to work on.
2. Make sure the image mode is set to **RGB**.
3. With an appropriate selection tool select the part of the image that doesn't include the scale bar and adjust the levels by moving the sliders in to the ends of the tails on the graph.
4. To **color the whole image the same color**, choose Color Balance and adjust to get the color you want. If you have the option, try using different color combos in the shadows, midtones and highlights to get more interesting effects.

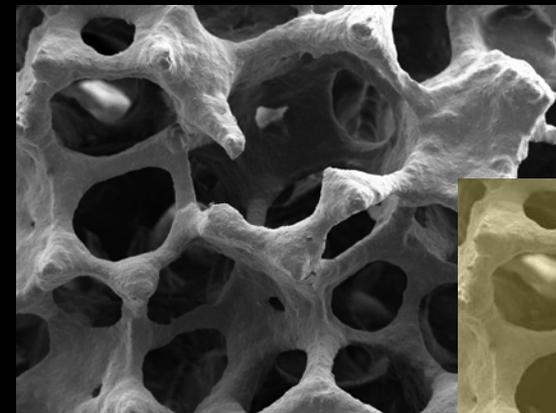
Digital coloring tips 2

1. To **color different parts of the image different colors** you can select them first with a selection tool. You can save your selections as work paths then apply different colors to each selection. Do this with the Color Balance or your favorite method.
2. When you have a selected area, if you want to, you can lift it off and place it on a different background e.g. plain black.
3. Another way to color different areas with different colors is to start by coloring everything one color. You can then change the color using any method you like and selectively apply these changes to specific parts of the image by using layer masks or the history brush. This can be repeated many times. Remember to save regularly.

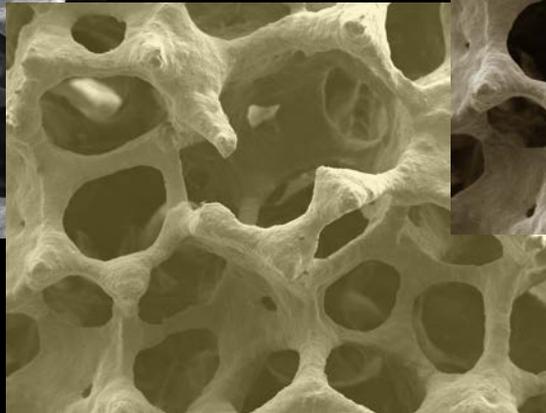


Digital coloring tips 3

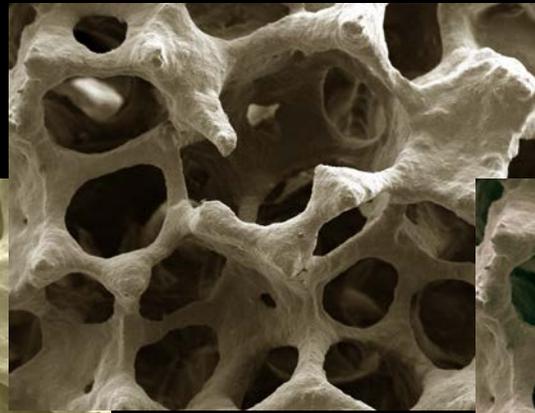
1. Unless you really know what you are doing, it is best do not paint over the image with the standard fill or brush tools, even using a low opacity. If you do, you loose contrast and highlights and the whole thing looks dull. This is one of the most common mistakes people make when they color SEM images.



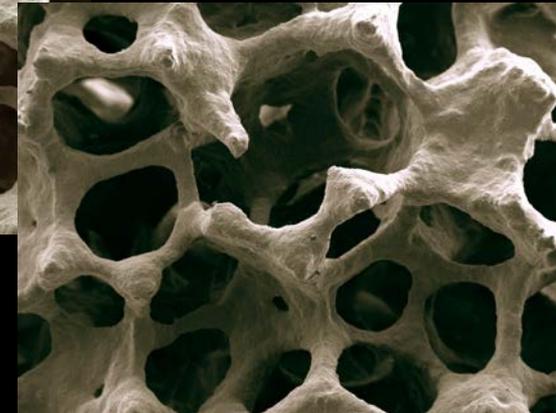
Starting image



colored with low-opacity fill - yuck!



colored with color-balance
– mid-tones only



colored with color-balance –
shadows, midtones and highlights

Digital coloring tips 3

Have fun!

There are lots of online tutorials as well.

coloring B/W images with GIMP

<http://emptyeasel.com/2008/10/24/how-to-digitally-color-a-black-white-photograph-in-gimp/>

