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Imaging

Chromaxion™

The Newsletter of Interesting Imaging Stuff

Break-in News

Like so many others, RM Imaging was the recent victim of a break-in. It seems someone got into our office and had a wild party. We immediately suspected leprechauns after finding a mess of empty Guinness bottles and shamrocks. During their revelry, in what they must have thought was a grand prank, they got into our computers and merged the Standard and Pro versions of SpectraShop 3 into a single program. At first this was very upsetting. But after much reflection, enhanced with copious quantities of frosty adult beverages, we realized this was a fantastic opportunity. So this mashup has now been released as SpectraShop 4.

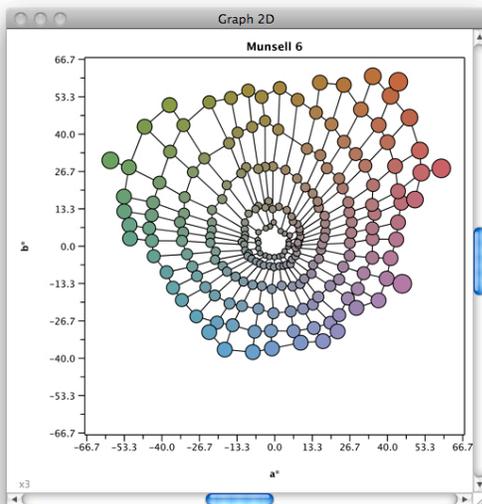
So what, you may ask, was the result of this leprechaun hack attack? Here is the rundown me boys.

New tools with SpectraShop 4:

1. Graph 2D Tool.

This is a very powerful, yet easy to drive graphing tool. Some of the graphs it can produce are:

- Graphs of any colorimetric value against any other.
- Gamut graphs.
- Paired graphs of color changes, with or without direction arrows.
- TRC curve graphs.



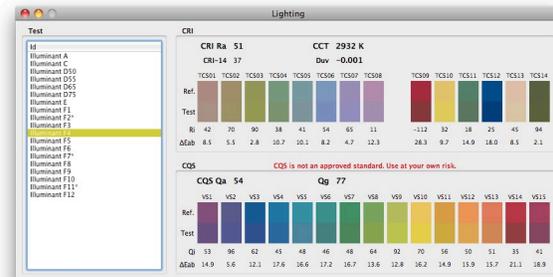
As an example of the Graph tool's versatility, here is a graph of the Munsell 6 Value plane which was constructed using the Graph 2D grouping feature. It contains 52 groups, comprised of 217 specimens. This type of graph cannot be accomplished in any other color program.

2. Lighting Tool.

This is the first publicly available tool (as far as I know) that implements the new Color Quality Scale (CQS), a proposed light source evaluation metric to replace the antiquated CRI (Color Rendering Index). For comparison purposes, both the CRI and CQS are presented in this tool.

Features:

- CRI Special Rendering Index
- CQS New color index from NIST
- CQS Gamut Area Index
- Simulated sample patches for CRI and CQS
- ΔEab values for all patches
- CRI and CQS text file export



3. Calculate Tool.

With all the power available in SpectraShop, there are times when it is necessary to combine spectra for additional capabilities. For instance, to calculate which filters will color balance one light to another. This is where the Calculate tool shines and another exclusive feature of SpectraShop.

- Add, subtract, multiply and divide up to 4 lists of specimens
- Normalize and scale specimens

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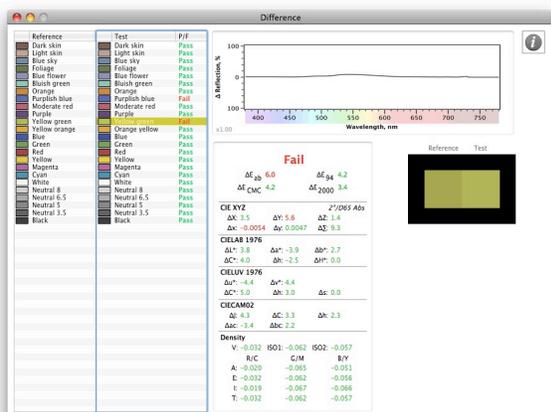
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4. Difference Tool.

Every color program has some type of difference tool. This one goes beyond the norm. Instead of just a few color difference metrics, this one calculates more than 20, depending on the specimen types. It also presents a spectral difference graph to demonstrate exactly what is causing the variance.

Features:

- Calculate differences from a single reference (good for QA/QC work)
- Compute differences between two paired lists (great for comparing two charts)
- ΔE_{ab} , ΔE_{94} , ΔE_{CMC} , ΔE_{2000}
- Pass/Fail indicator
- Difference spectral graph
- Differences of more than 20 colorimetric values



5. Enhancements

- One of the most requested features was an improvement to the patch simulator. Now all the patches undergo a chromatic adaptation to better simulate the color under the given illuminant.
- All the graphs are created at publication resolution (≥ 300 ppi) and can be printed directly from SpectraShop!
- All graphs can be saved to a disk file. This is great if you need to include the graph in a report.

Now for the really cool news!

[SpectraShop 4](#) is the same price as version 3, \$95.

[Upgrades](#) from SpectraShop 2 or 3 are only \$49.

Special Note: For those of you that purchased SpectraShop 2 or 3 after 1 October 2010, you will get a free upgrade!

Industry News

RIP Mini ColorChecker

If you were planning to get a Mini ColorChecker for your small item photography, or as an ultra-portable color chart, you are too late. A recent check of discontinued products on the X-Rite website shows the Mini ColorChecker has joined the dearly departed.

It's replacement, the ColorChecker Passport, has better armor and more patches, but it is much bigger, especially when opened for business. So at the moment, there is nothing from X-Rite that is a compatible replacement.

But do not despair. Something is in the works to fill the void. Stay tuned to this channel for further developments, reported as they happen (sort of).

RIP ColorShop

Originally released by Light Source with its Colortron® spectrophotometer, this program was an innovative mix of tools for color measurement and analysis. Acquired by X-Rite when it purchased Light Source, it was upgraded for OS X to ColorShop X, and soldiered on. Now X-Rite has retired it from service. Curiously, X-Rite has no replacement product.

However, with much more powerful analysis and graphing tools, SpectraShop™ can step in and fill much of that void. And the really cool thing is that **SpectraShop™ costs less than ColorShop X did!** [Check it out.](#)

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Join In!

A newsletter is only useful if it informs, aids or improves things for its readers. You, the reader can help by sending me your questions, comments, suggestions, even gripes. They will be gratefully received, even the gripes.

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Tech Tip: How to Check a Printer Profile

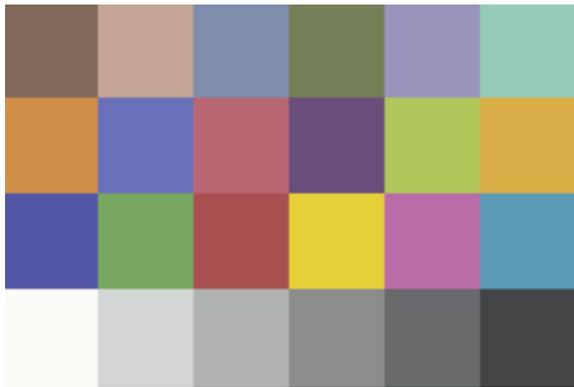
In a color management system, all the parts in the imaging chain affect the image, from the image capture, through the processing, to the final print. SpectraShop can help verify how well the printer profile performs in the system.

Begin by deciding on a reference, something which will be the master colors to which the print will be compared. In this case, the venerable ColorChecker Classic is being used because it is very familiar and readily available.

The first step is to get colorimetric values for the reference. One way is to download a ColorChecker Classic collection from the [Spectral Library](#). Another method is to measure a color chart. In this instance a ColorChecker Passport was at hand. Since it has a ColorChecker Classic on one page, it will do. Use either the *Measure Specimens* or *Measure Chart* tool to measure each patch of the Passport's ColorChecker Classic chart. These spectral measurements will provide the reference colorimetric values.

Next make an image file to print. Create an L*a*b* file in Photoshop (this is erroneously called Lab in Photoshop). For a ColorChecker Classic, a size of 6 pixels wide by 4 pixels high works well. Then zoom in this tiny image to the maximum allowed.

Using the *Pencil* tool with the Lab color picker, enter the L*a*b* values from SpectraShop for each ColorChecker patch and fill each pixel with the appropriate color. Since Photoshop does not allow fractional Lab values, be sure to round the SpectraShop values to the nearest integer.



When all the patches have been created for the tiny image, scale the image to a good printing size with the *Image/Image Size* menu tool.

Then print the image using the printer profile with the rendering intent most appropriate for your work.

Let the chart dry for several hours at least. With some papers and inks it is necessary to let the print dry for a day or two.

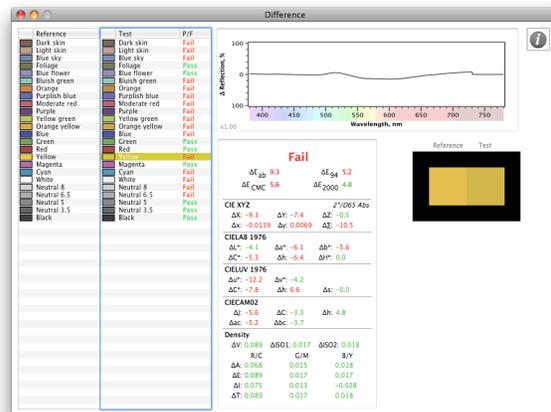
Using SpectraShop, measure the printed chart with the *Measure Specimens* or *Measure Chart* tools.

Now the two sets of specimens can be compared numerically with the *Difference Tool*.

Begin by selecting all the specimens in the reference collection made by measuring the original chart. Drag these specimens to the *Reference* list in the *Difference Tool*. Then select all the specimens in the printed chart collection and drag them to the *Difference Tool Test* list.

When there is more than one specimen in the *Reference* list, a comparison is made with each row of the *Reference* list with the corresponding row in the *Test* list. This is known as a *paired comparison*.

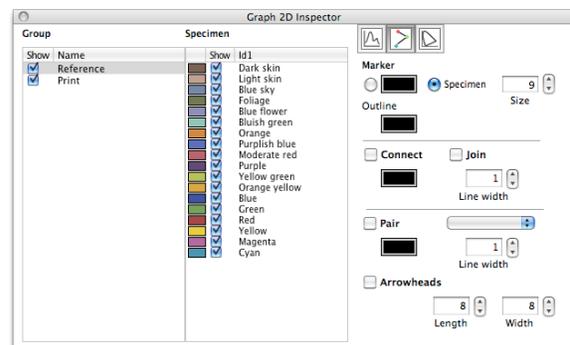
As each specimen in the *Test* list is highlighted, the differences between each pair are displayed. In addition, if the difference exceeds its threshold, the value is displayed in red text. Values below the threshold are shown in green text.



Numbers are fine, precise and scientific, but it can be hard to spots trends looking at a pile of numbers. Graphical displays show trends easier, so let's examine the two collections with the *Graph 2D Tool*.

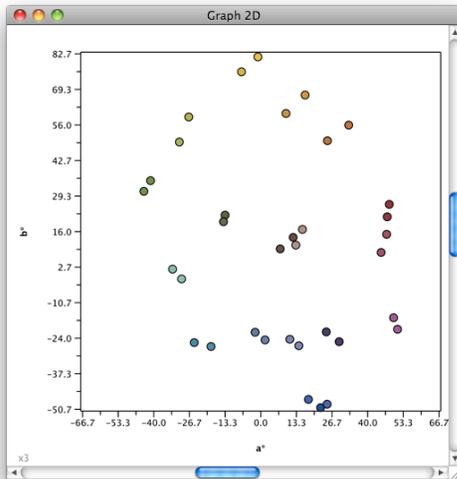
Select all the specimens in the original chart collection. Drag them to the *Group* list in the *Graph 2D Inspector*. They are displayed as round patches in the *Graph* window.

Then select all the specimens in the printed chart collection. Drag them to the *Group* list in the *Graph 2D inspector*. Both groups are now visible in the *Graph* window.



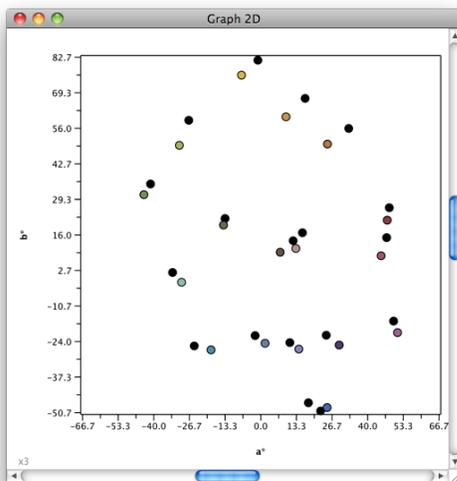
To differentiate the groups, click on the name "Untitled 0" in the *Group* list. The name can now be changed to "Reference". Then click on the "Untitled 1" name. Change it to "Print". This will make it easier to work with the groups.

To give the graph some correlation with the numeric values in the *Difference* window, click on the *Graph Properties* button in the *Graph 2D Inspector*. Then choose a^* from the Horizontal axis popup menu and b^* from the Vertical axis popup menu.

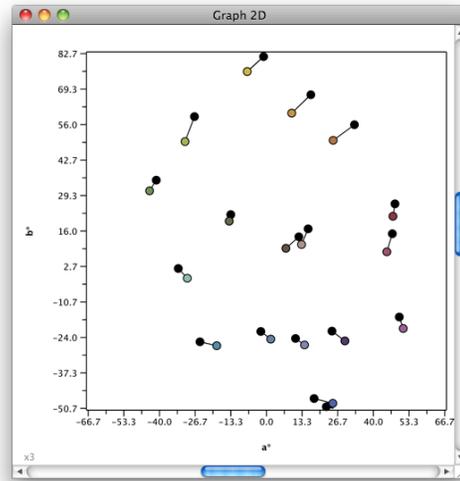


By default the two groups are shown using each patch's color which makes it difficult to tell which is the reference and which the print.

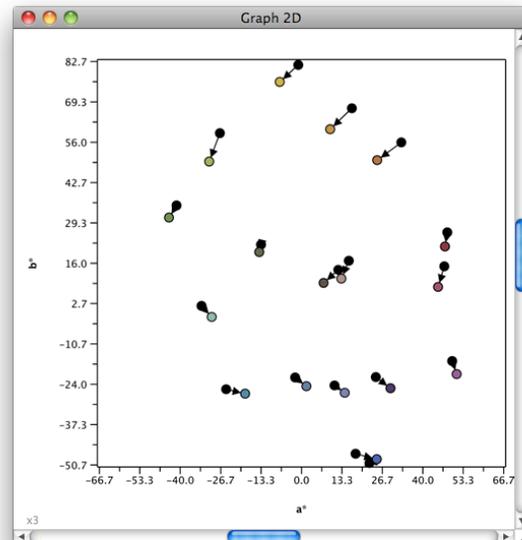
Highlight the reference group in the *Graph 2D Inspector*. Then click on the *Group Properties* icon at the top of the *Graph 2D Inspector* window. Check the *Marker* radio button to change the reference patches to a common color, which is chosen by clicking on the *marker fill color box*. Black is the default marker color and is the one used for this example.



With the reference group still selected in the *Group* list, check the *Pair* box. Then select the printed group from the *Pair* popup menu. Lines will then appear connecting each reference specimen patch with its appropriate printer patch.



To show the direction of change more clearly, check the *Arrowheads* box. Arrowheads are always drawn at the end of the line, in this case it will be at the printer specimen end.



The length of the lines in the *Graph* window are now the same as the ΔE_{ab} values in the *Difference* window.

Any overall color balance shifts in the printed image will be readily apparent in the graph as arrows pointing in the same direction.

Using this method it is easy to compare choices of rendering intents, black point compensation, or any other variables in the printer profile, the print driver and even the choice of papers and inks.