

DStretch Suggested Work Flow

1. Open ImageJ
2. Open your image
3. Open **DStretch** Plugin
4. If colors are need to be adjusted, use **Adj Col** button to smooth colors
 - Smoothing colors will help in noisy image
5. Use **Auto Contrast** button to optimize image content. Sometimes this helps and at others it doesn't. The **Reset** button will undo the **Auto Contrast**. If it helps save the image.
6. Choose DStretch Enhancement
 - See Table for assistance is selecting colorspace
 - See Operating DStretch
 - Use the **Flat** button to flatten the illumination of the image
7. If the colors are wild or a background color is interfering with the visualization, then use the **Reset** button to undo the DStretch and proceed with steps 9, 10, and 11. Otherwise proceed to step 11.
8. If colors are wild, use **AdjCol** button
 - Reducing saturation can tame wild colors produced by DStretch
9. If a background color is interfering with the visualization or the DStretch enhancements, use **CB** button
10. Go to step 6
11. Use the **MATRIX** button to save the matrix and colorspace in a text file for reference and future use.

NOTES on other Buttons:

- **Save** Saves the current image as a jpeg Quality is determined by the ImageJ jpeg quality default. When the image is saved this number appears on the top of the image following the file name. You can also use the Save in the **Expert mode** set the quality.

Operating DStretch

I find that DStretch really stretches my imagination since it can and does so many wonderful and helpful things. After several days of brut force I started reading and outlining. The approach I am going to outline is what I finally believe is a repeatable and organized approach to finding what is not apparent. By its nature it is iterative.

At this point you should have completed the first six steps of the DStretch Suggested work Flow.

1. Use the **Cycle** button to select only the General Purpose colorspaces LDS, LAB, YDS, YUV. Unfortunately RGB is the only General Purpose color space not listed. This should help you see what you might want to refine. Also this should provide the feedback to determine if you need to reduce or increase saturation (Step 9) or adjust the color balance (Step 10).
2. Once you have determined what the Saturation and color balance are good and you know the color of the subject of interest, then run the appropriate colorspaces using the table. In a more orderly world the choices would be grouped for what they are “Good For” so I could concentrate on the image.

Guide to Selecting Colorspaces

Colorspace	L,A,B	Speed	General Purpose	Good for						Remarks
				Red	Yellow	Black	White	Blue	Green	
CRGB		F		Y						Matrix
LAB	0.50, 1.00, 1.00		Y			Y	Y			
LABI										Matrix, inverted colors
LBK	0.50, 1.10, 0.60					Y				
LBL	0.50, 1.20, 1.00					Y				
LDS	0.50, 0.90, 0.50		Y		Y					
LRD	0.50, 0.80, 1.20			Y						
LRE	0.50, 0.50, 1.00			Y						
LWE	0.50, 1.00, 1.40						Y			
LYE	0.20, 1.00, 2.00				Y					Yellow turns to dark brown
YBG	2.00, 1.00, 1.70	F							Y	
YBK	1.50, 9.20, 1.60	F				Y		Y		
YBL	1.50, 0.40, 2.00	F				Y				
YBR	1.00, 0.80, 0.40	F		Y						Better reds than YDS
YDS	1.00, 0.50, 1.00	F	Y		Y					See YBR for better reds
YDT	1.75, 0.60, 1.00	F		Y	Y					Closer to LDS than YDS
YRD	2.00, 1.00, 0.40	F		Y						
YRE	8.00, 1.00, 0.40	F		Y						Extreme
YUV	0.70, 1.00, 1.00	F	Y							
YWE	1.50, 1.60, 0.20	F					Y			
YYE	2.00, 2.00, 1.00	F			Y					Yellow turns to dark brown
RGB		F	Y							
RGB0		F		Y						Matrix