

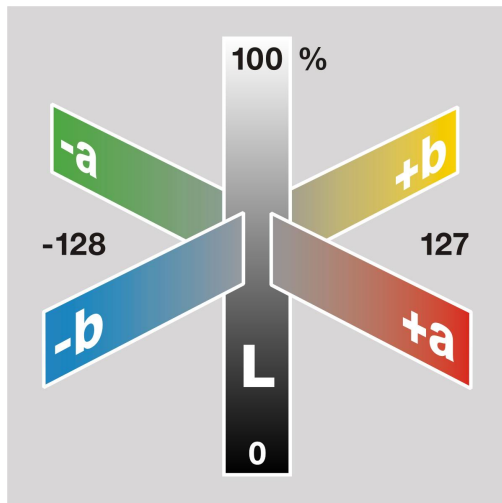
# Perceptions of Matplotlib colormaps

Kristen M. Thyng

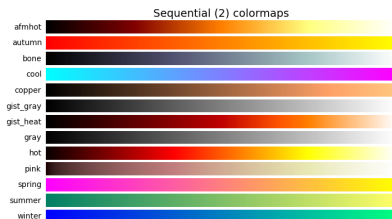
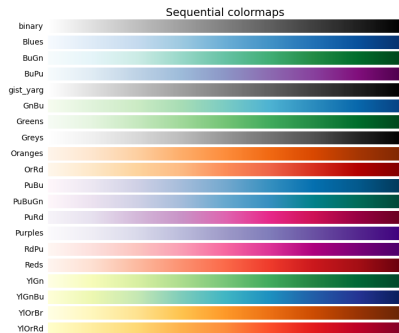
Texas A&M University

July 10, 2014

# CIELAB Color Model

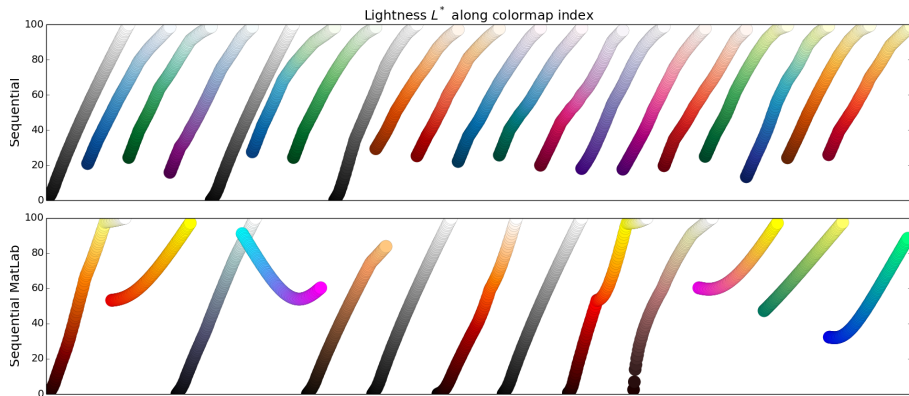


# Lightness of matplotlib Colormaps

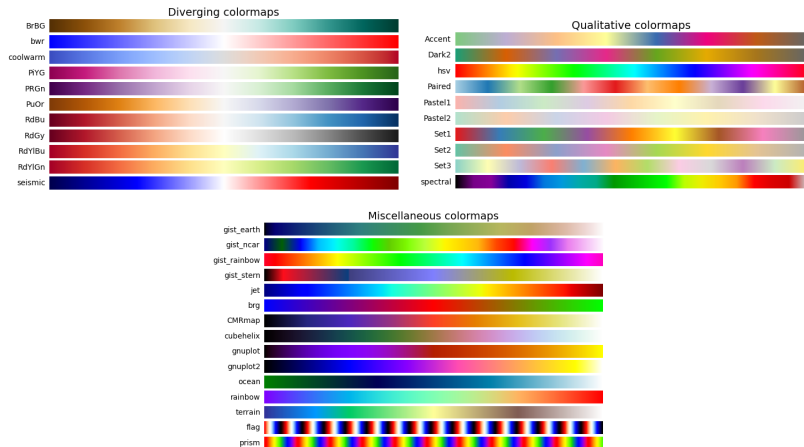


[http://matplotlib.org/examples/color/colormaps\\_reference.html](http://matplotlib.org/examples/color/colormaps_reference.html)

# Lightness of matplotlib Colormaps

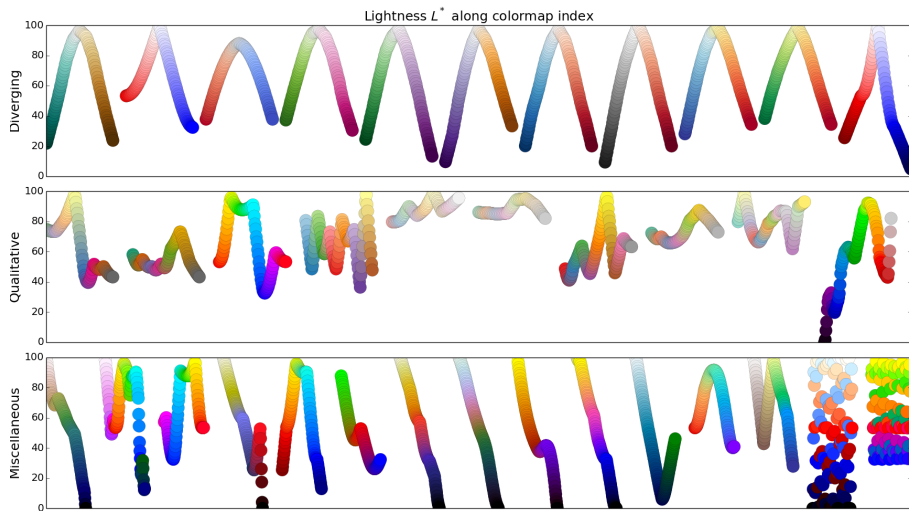


# Lightness of matplotlib Colormaps

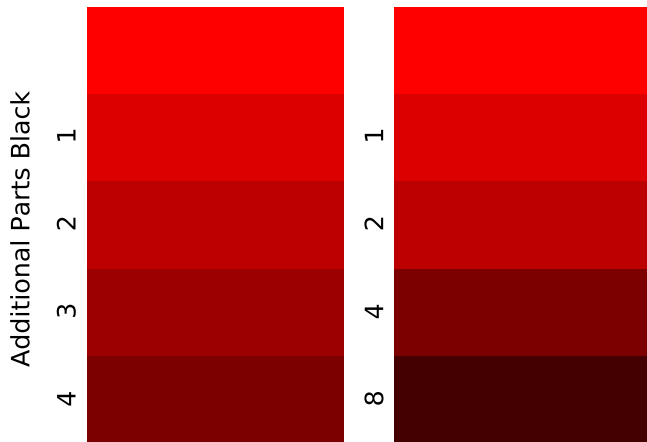


[http://matplotlib.org/examples/color/colormaps\\_reference.html](http://matplotlib.org/examples/color/colormaps_reference.html)

# Lightness of matplotlib Colormaps

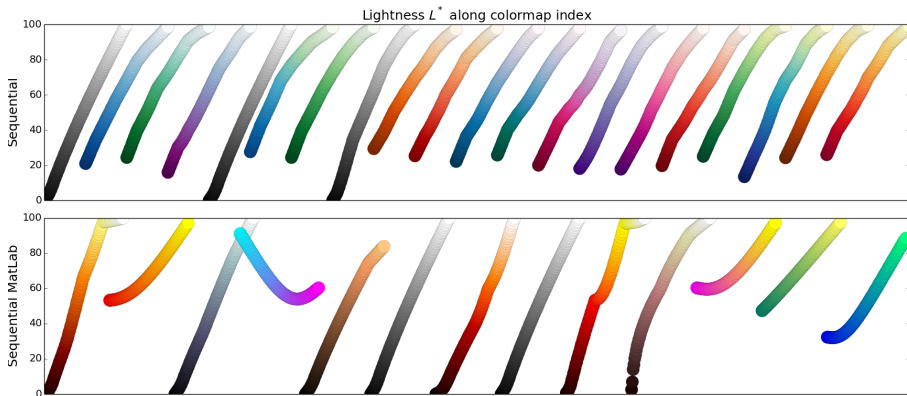


# Perceived Lightness: Weber-Fechner Law



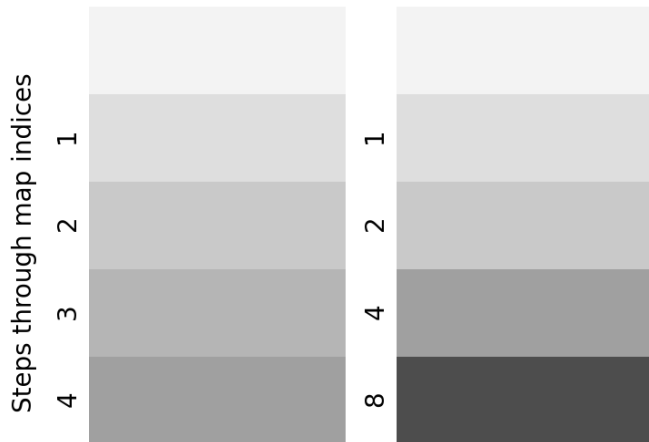
Albers, J. (1975). Interaction of color. Yale University Press.

# Improvement to Binary Colormap?





# Improvement to Binary Colormap?

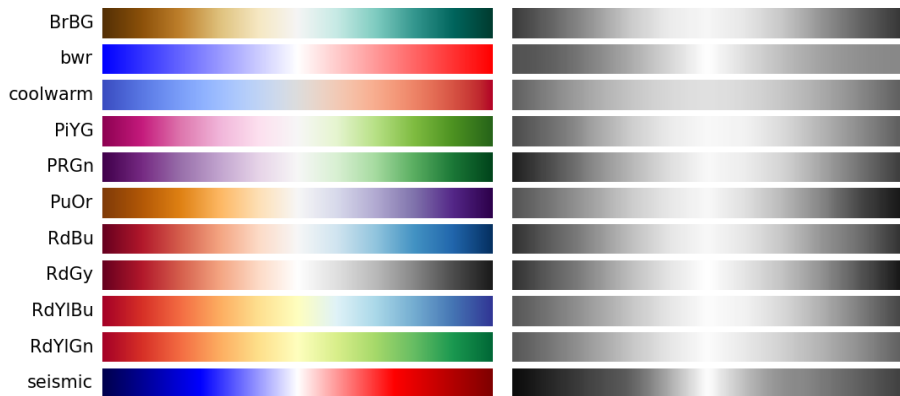


# Printing to Grey Scale

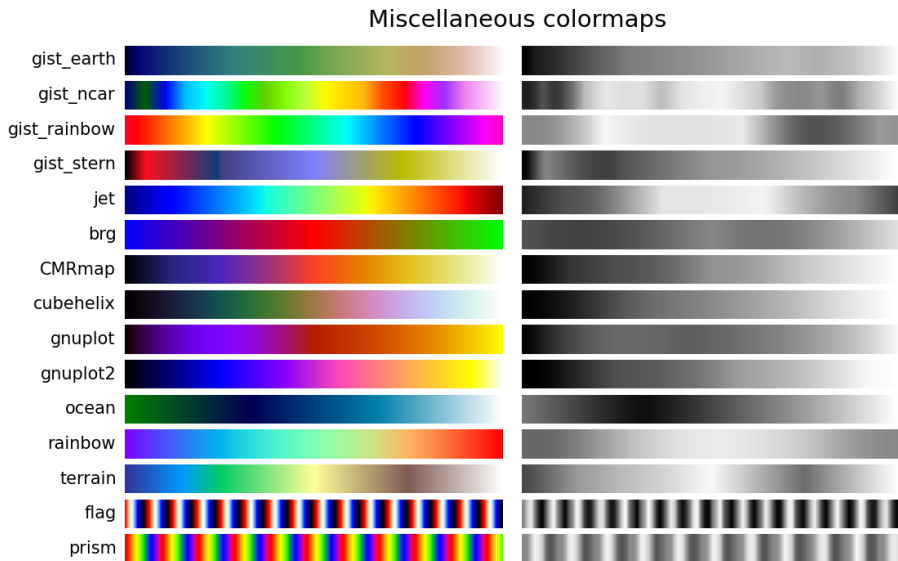
MANY WAYS TO DO THIS - introduce a few ways What to be aware of?  
What is best? There are many algorithms but probably best is just to be monotonically increasing in luminance

# matplotlib Colormaps in Grey Scale

## Diverging colormaps

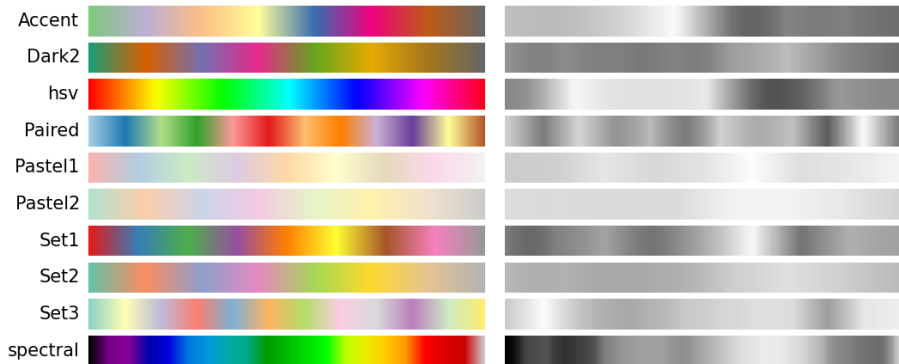


# matplotlib Colormaps in Grey Scale

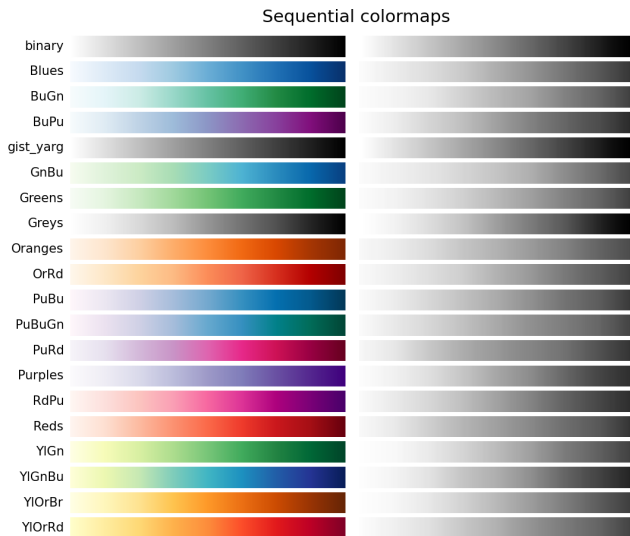


# matplotlib Colormaps in Grey Scale

## Qualitative colormaps

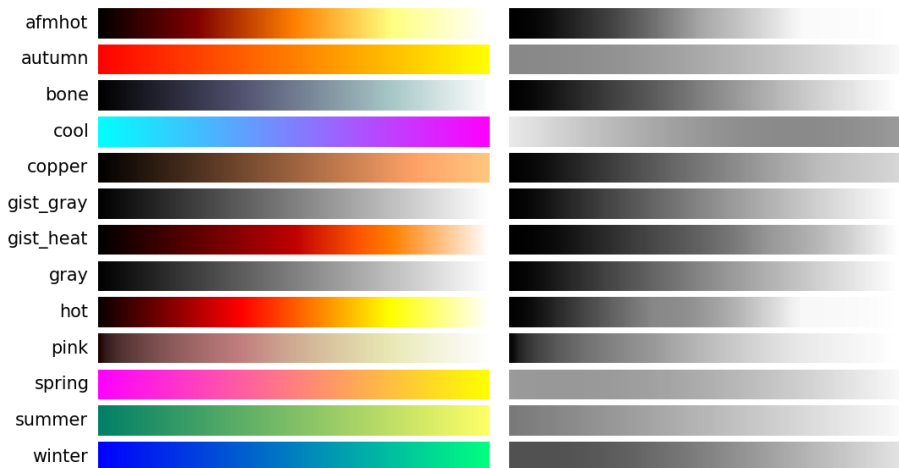


# matplotlib Colormaps in Grey Scale



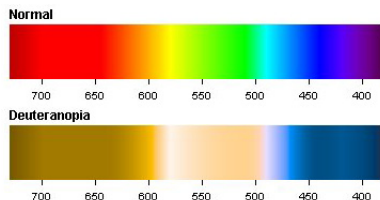
# matplotlib Colormaps in Grey Scale

Sequential (2) colormaps

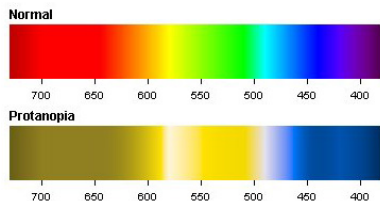


# Color Blindness

Protanopia (2% male population, half mild form)



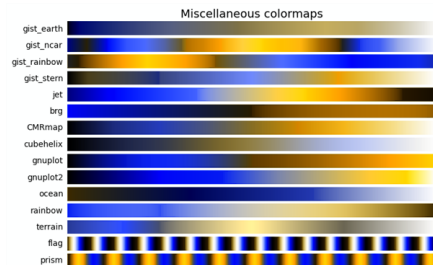
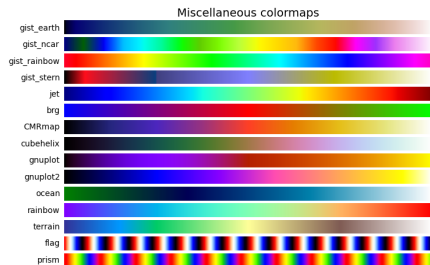
Deuteranopia (6% male population, mostly mild form)



<http://www.color-blindness.com>

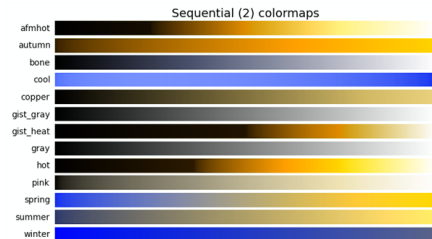
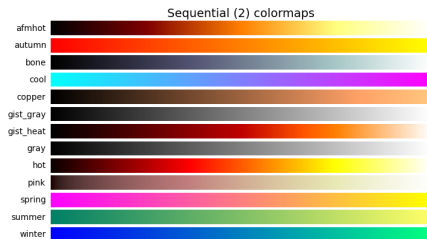


# Color Blindness



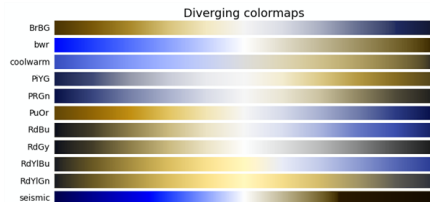
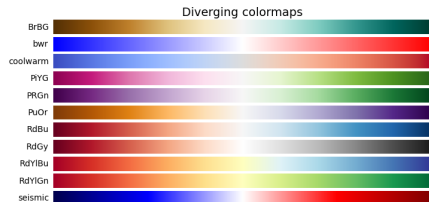
<http://aspnetresources.com/tools/colorBlindness>

# Color Blindness

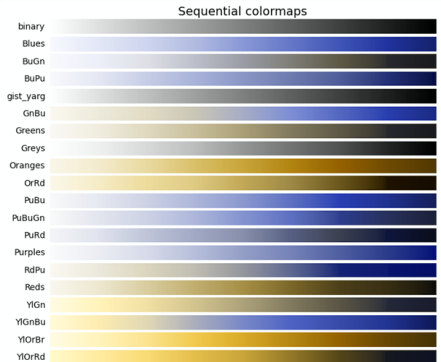
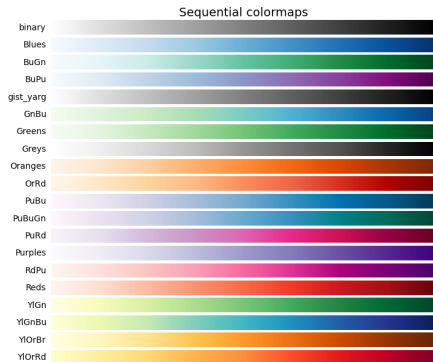


<http://aspnetresources.com/tools/colorBlindness>

# Color Blindness



# Color Blindness



# Recommendations

- Best colormap depends on application, but for form information, perceptual colormaps are best
- Colormap for best lightness perception, hue combination, printing to grey, and color blindness? FILL IN

- Matteo Niccoli: <http://mycarta.wordpress.com/2012/05/29/the-rainbow-is-dead-long-live-the-rainbow-series-outline/>
- <http://www.color-blindness.com>
- BLACK AND WHITE ALGORITHM PLACES
- FILL IN