Creating Color Palettes

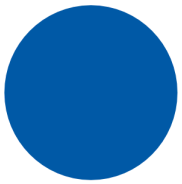
Background:

Why should you develop a specific color palette?

- A carefully selected color palette is a powerful tool for your science to tell a compelling story!
- Choosing color schemes can also improve accuracy - for example improving diagnosis of heart disease or communication of climate change (see refs!)

How do we define colors?

- Colors are classified by their HEX (hexadecimal), RGB (red, green, blue), HSL (hue, saturation, lightness) or CMYK (cyan, magenta, yellow, black) identifiers



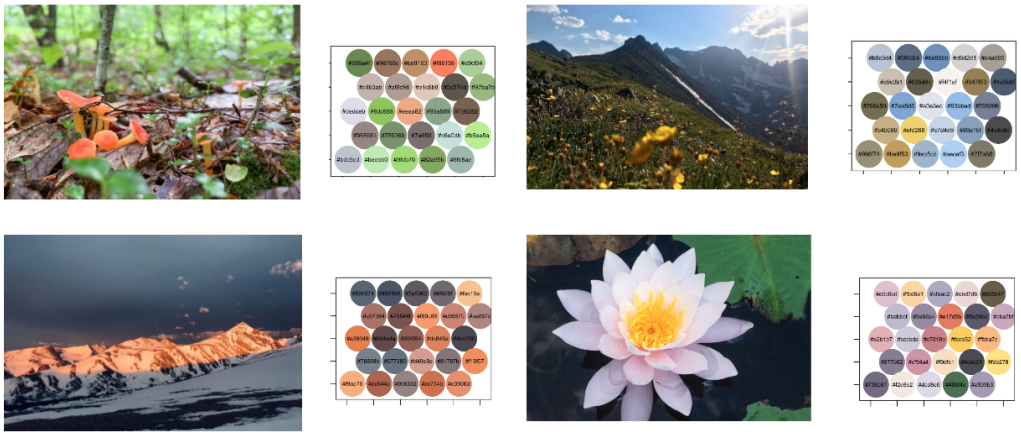
Blue
RGB: 0 89 166
HEX: 0059A6
CMYK: 96 71 02 0
HSL: 208 100 33

- You can think of HEX and RGB as how a computer thinks about color, HSL as how a human thinks about color, and CMYK as how a printer thinks about color

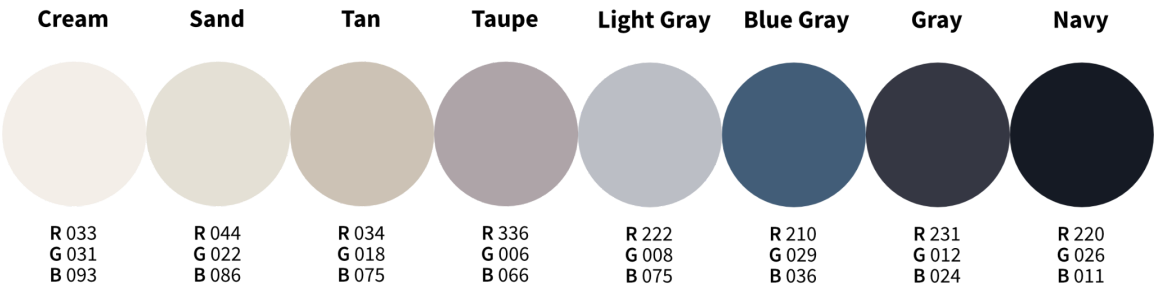
Tips:

1. *Use color blind friendly palettes for publications*
   - Avoid red/green combinations (see the full resource guide for colorblind friendly palettes here)
2. *Use photos or logos as inspiration for color schemes*
   - Consider using a photo related to your research or a logo from your institution as a place to draw colors for your palette
   - Powerpoint or Adobe Illustrator have eyedropper tools for creating palettes from images or logos, or you can use online tools
   - Check out the Calecopal R Package: a selection of color palettes inspired by images and wildlife here in California - palettes can also be adjusted to be continuous or discrete

- Use the NCEAS developed [LTER Palette Finder R Package] to find discrete or continuous color schemes from LTER photos or your own images

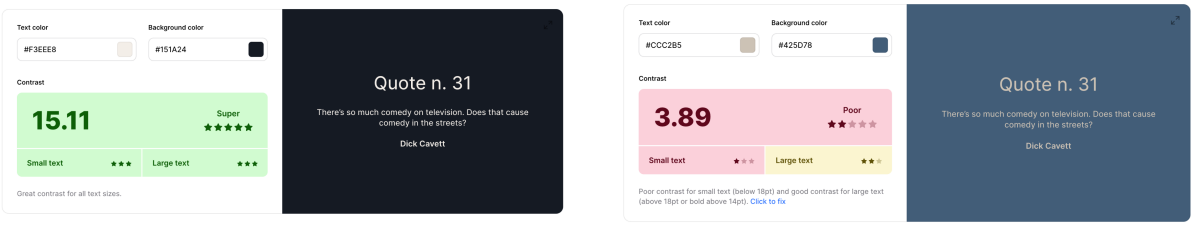


3. *Add tints, tones, and shades rather than just more colors*
    - Less is more when it comes to color palettes - try to choose 1-2 main colors, an accent color, and a neutral - then and add variation with tints, shades, or tones
    - Tints are adding white to the color, tones are adding gray, and shades are adding black
4. *Search existing color palettes online*
    - There are many repositories of color palettes for designers - like [ColorHunt] or [Coolers] or [Adobe Color]
    - Even a simple google search is really helpful if you can narrow down the number of colors you need or if you have a base color or two in mind
5. *Use neutrals beyond white and black*
    - Absolute blacks and whites actually exhaust the eyes over long periods
    - Try alternative neutrals, like some of my favorites below:



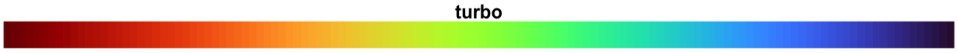
6. *Check your colors for contrast scores*
    - When placing text in one color over a background color, [check to see] if it passes web content accessibility standards (WCAS) for contrast levels, for example my

color “cream” above on my color “navy” shows excellent contrast, while “tan” on “blue gray” fails unless at very large text sizes



7. *Use perceptually uniform color maps for data visualization*
    - When designing continuous color schemes, be careful with default rainbow maps like below, which have issues in “perceptual uniformity” - that is, colors are changing much faster in the yellow region than the green region, visible in bright spots on the rainbow

    - When using this for data visualization, this can lead to unintentional data artifacts (as documented in a paper on ~30% of IEEE conference papers!)
    - Try try the [Viridis R Package](), which includes eight perceptually uniform color blind tested options (including a rainbow alternative “Turbo”)



References:

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