# COMP 4433: Critique 1

Palette choice in data visualization is critical for multiple reasons. First, abrupt transitions between color palettes are often mistaken for substantive changes in the data. The solution to this issue is to use perceptually uniform palettes. Second, individuals with color viewing impairments may have difficulty differentiating colors in the palette. Both perceptually uniform and non-perceptually uniform palettes are afflicted by the second issue.

Read the article, *Rainbow Color Map (Still) Considered Harmful* by Borland and Taylor [1]. This is an older article, but it makes some timeless points.

Two sets of three plots have been provided to you for use in the first activity. These plots display synthesized county-level US data drawn from a random normal distribution. One set of plots displays the data in histograms while the other set uses choropleths (filled maps) to display the data using the same color palettes as the histograms. Please complete the following activities and provide a short narrative response (approximately one page) describing your findings and opinions.

1. Color vision in humans is based on three types of photoreceptor cones that are sensitive to different parts of the color spectrum. Red, green and blue cone deficiencies are known as Protanopia, Deuteranopia and Tritanopia, respectively. Assess the provided plots using the Coblis Color Blindness Simulator [2]. While this tool does not implement any definitive tests, it does offer the user a simulated view of what the palette will look like to someone with a certain color viewing impairment.

- What does the visual assessment of these three palettes using Coblis suggest?
- In your opinion which palette is best suited for communicating the data to audiences with color viewing impairments?
- What (if any) are the advantages to using palettes with vivid color (distinct/discernable hues)?
- What do you notice when viewing the same palette in a histogram versus a choropleth?

2. Visit the Colorpicker for data website [3]. There are many different open source tools for developing color palettes, and while this site does not offer any diagnostic tools for addressing color viewing impairment, it does offer a simple interface for building perceptually uniform palettes. On this site the user can modify hue (H), luminance (L) and chroma (C) to produce a palette.

- Considering the color picker options H-L, C-L and H-C, what effect does drawing a vertical or horizontal line across the available color space have in terms of the resulting palette?

**Deliverable**
Submit a text file, word document or pdf with your responses.

[1] D. Borland and R. M. Taylor Ii, “Rainbow Color Map (Still) Considered Harmful,” *IEEE Computer Graphics and Applications*, vol. 27, no. 2, pp. 14–17, Mar. 2007, doi: https://doi.org/10.1109/mcg.2007.323435.

[2] https://www.color-blindness.com/coblis-color-blindness-simulator/

[3] https://tristen.ca/hcl-picker/#/hlc/6/1/15534C/E2E062