Get Your Message Across: A Guide to Artwork and Illustrations for Better Impact and Clarity

Wednesday, July 29, 2020 1:30 PM – 2:30 PM EDT

Live Q&A:

This workshop will cover the production of artwork and illustrations that effectively convey information and complex concepts. The workshop will consist of short presentations on principles of good design, using R/Python to generate complex data figures and software and other resources that can be used to produce effective figures. Pointers on fonts, colors, density of data, and design of graphs for publication will also be presented. The presentations will be followed by a question & answer period.

Patrice Salomé, Science Editor, the Plant Cell

Figure basics: size, colors, resolution…

Critical aspects of figure preparation:

+ Figure size
+ Font size and type
+ placement of images and panels
+ color combinations and color blindness
+ saving figures in the right format and resolution

Graphics software packages

KaleidaGraph

ORIGIN®
Data Analysis and Graphing Software

Excel

R Studio®

Adobe Photoshop

AFFINITY Photo

Adobe Illustrator

AFFINITY Designer

canvas

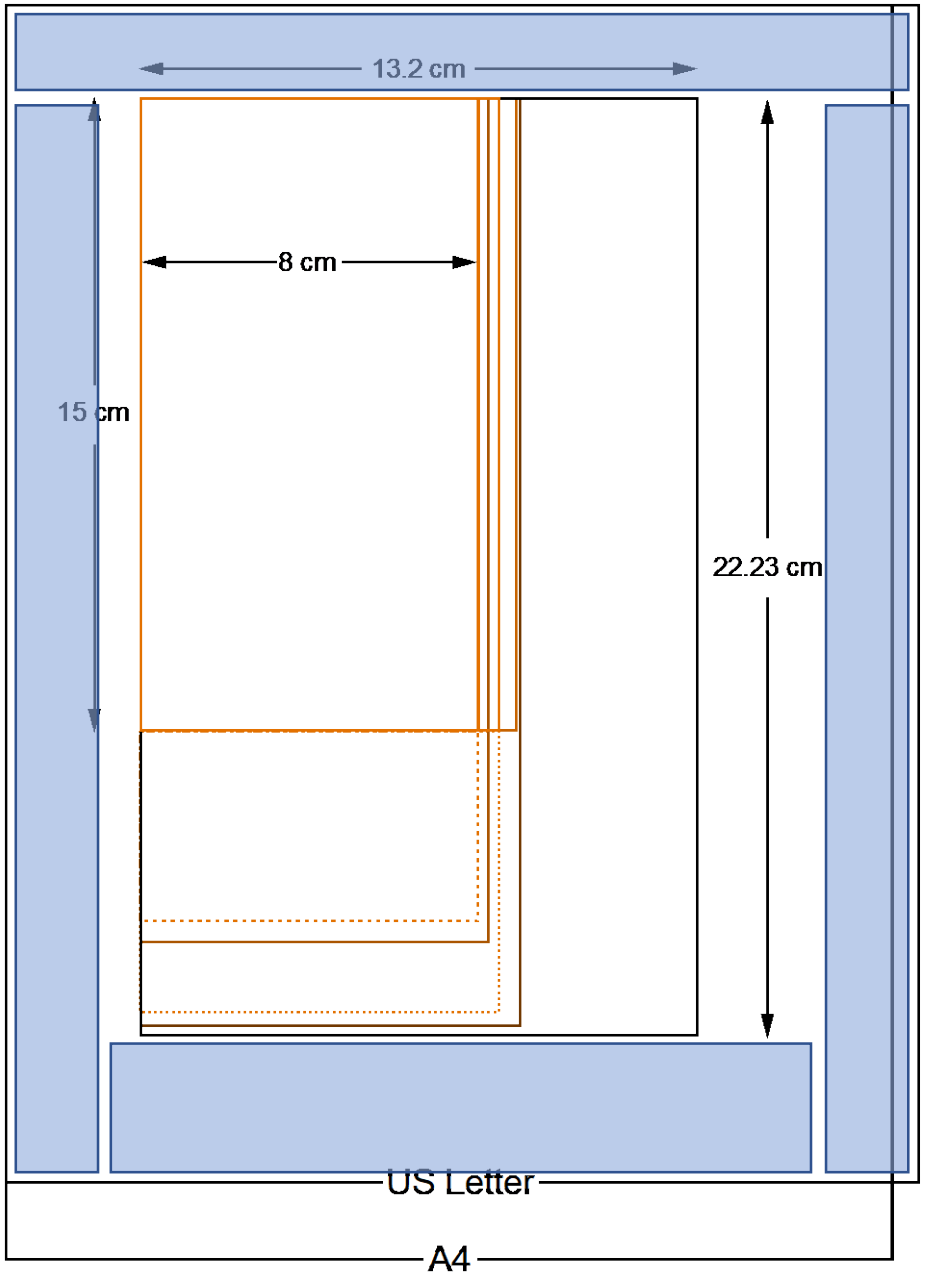
Pixelmator

Generate data plots

Image processing

Figure assembly

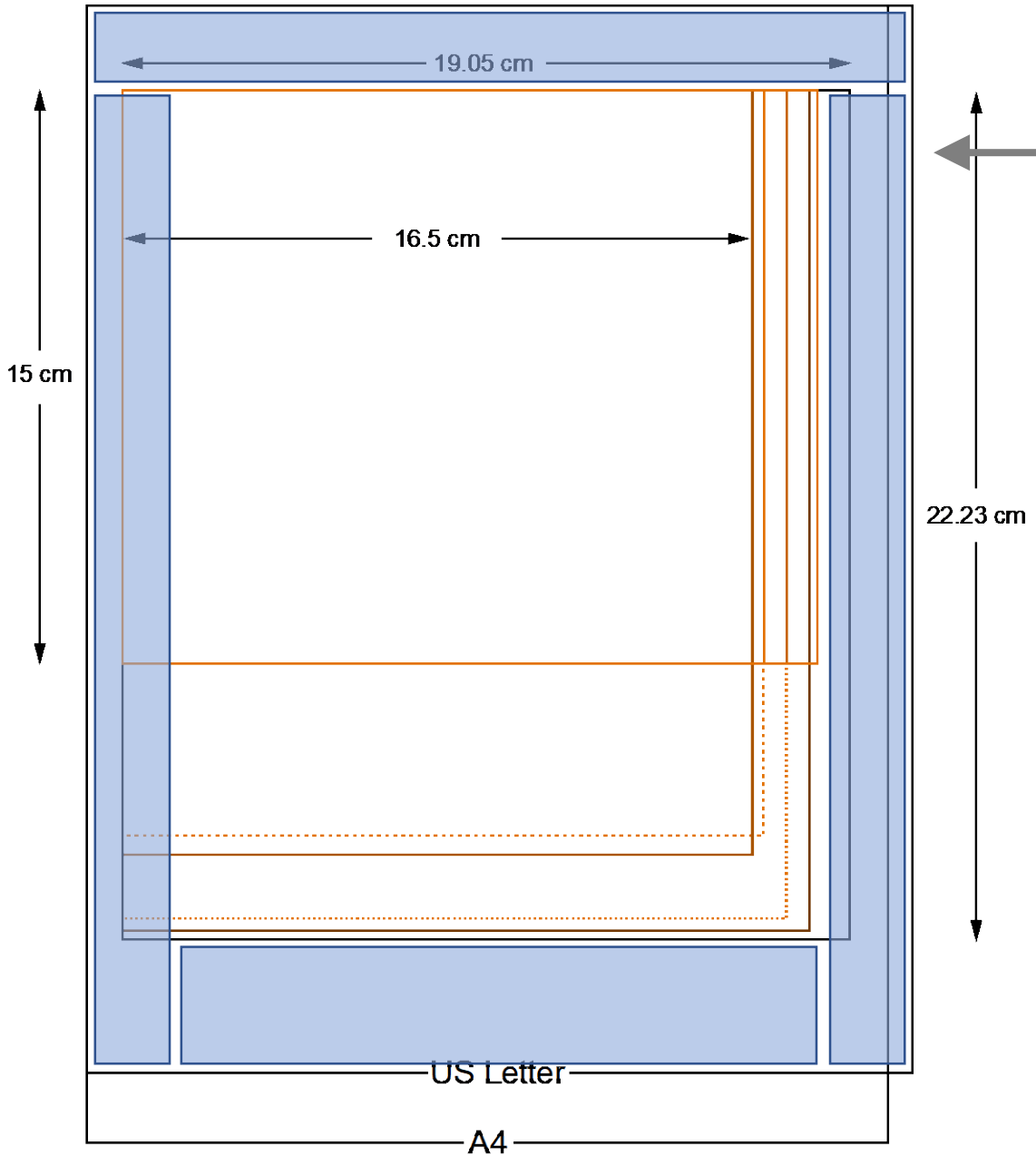
First question: how big is the figure?



One-column format from several journals

Missing elements:

+article header
+margins (left, right, top, bottom)
+FIGURE LEGENDS

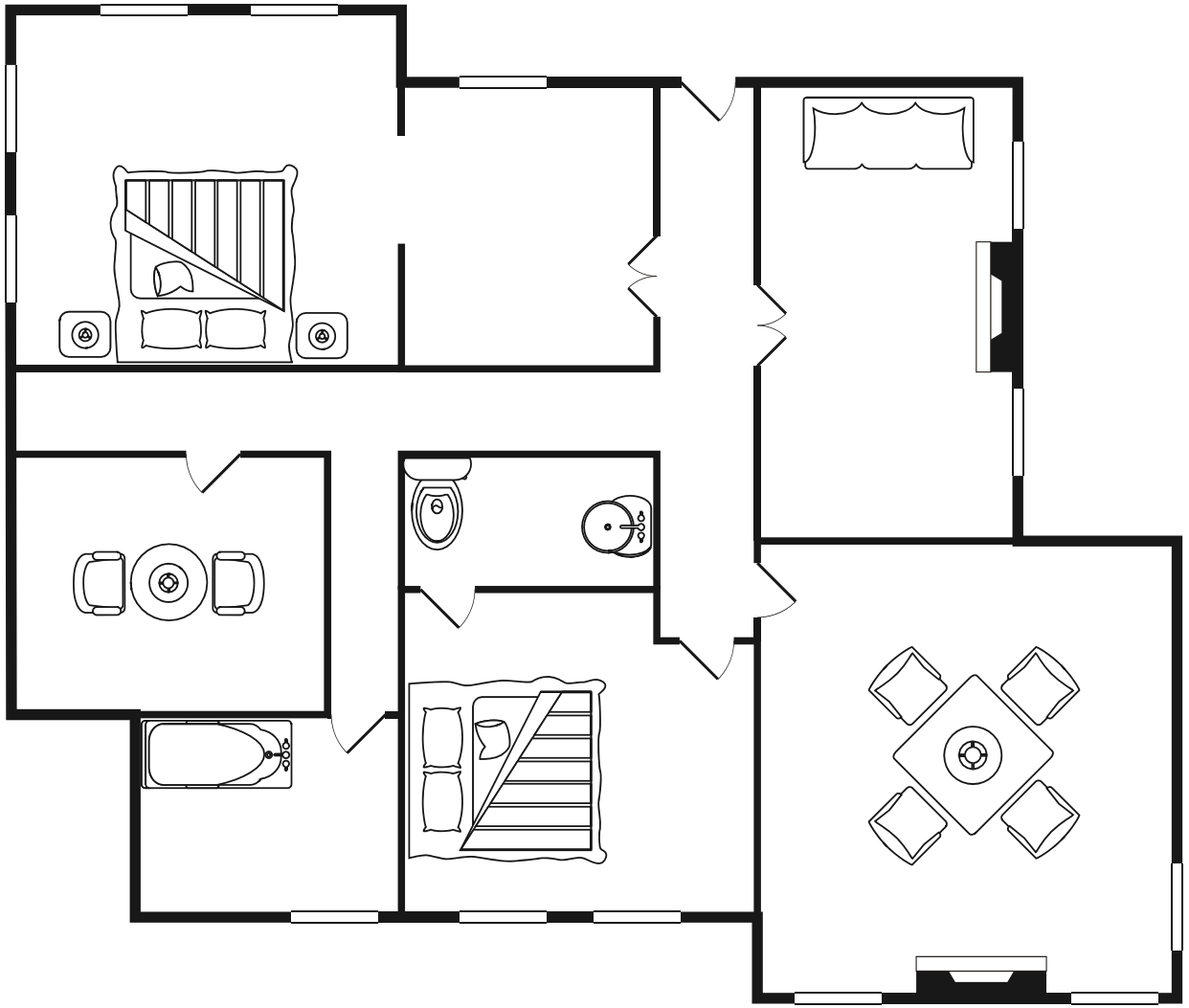


Two-column format from several journals

Check Instructions for Authors

Set your page to one- or two-column width

Making figures is like furnishing a room/house



+ keep figures simple (when possible)
+ be mindful of the allowed space
+ group panels by topic
+ use the same style for all related panels (even across figures)

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+ use the same axis thickness throughout
+ the axes should NOT be thicker than the data lines
+ be mindful of default settings in your graphics software package

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PREPARE YOUR FIGURES AS A REVIEWER, NOT AN AUTHOR

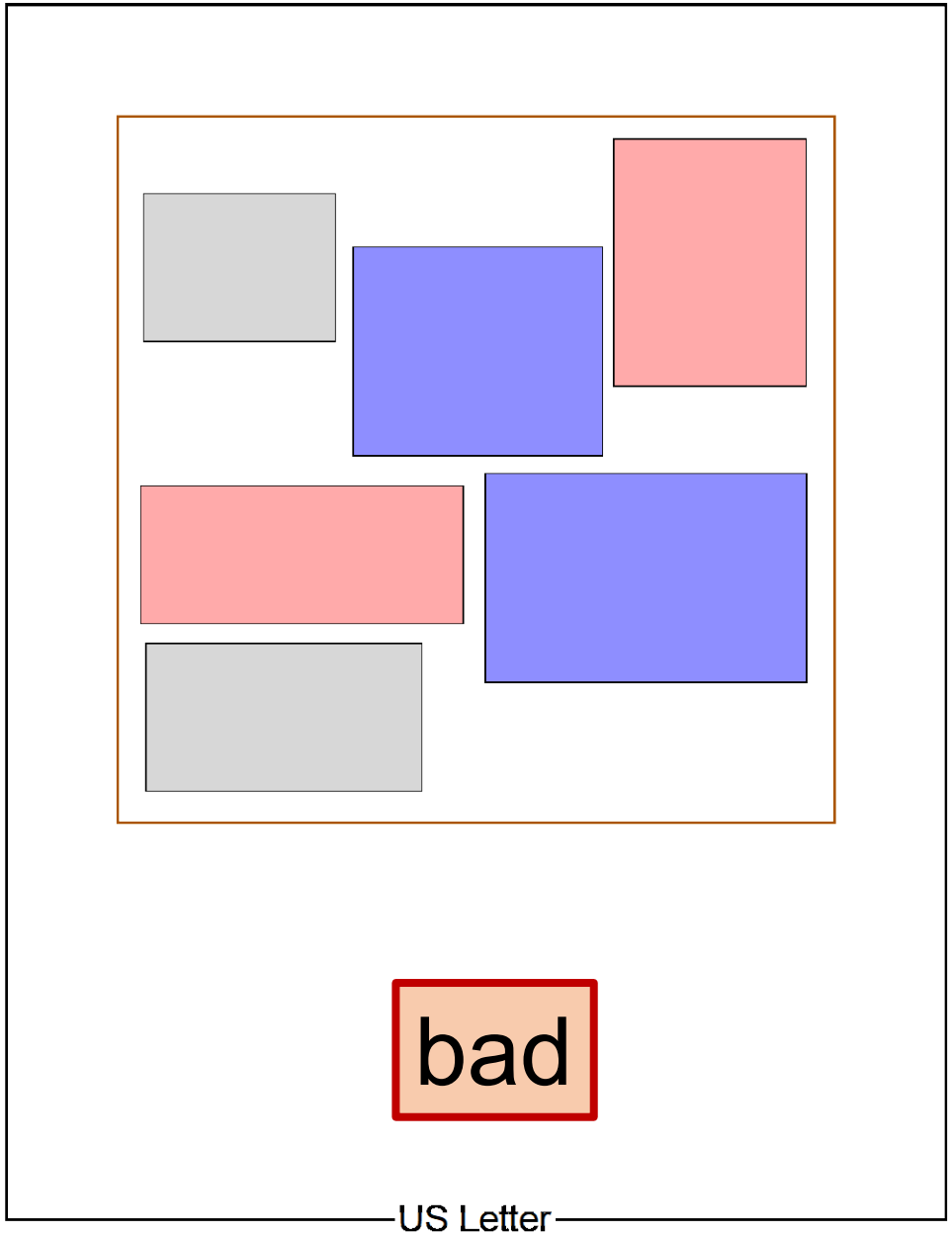
Next question: which font to use?

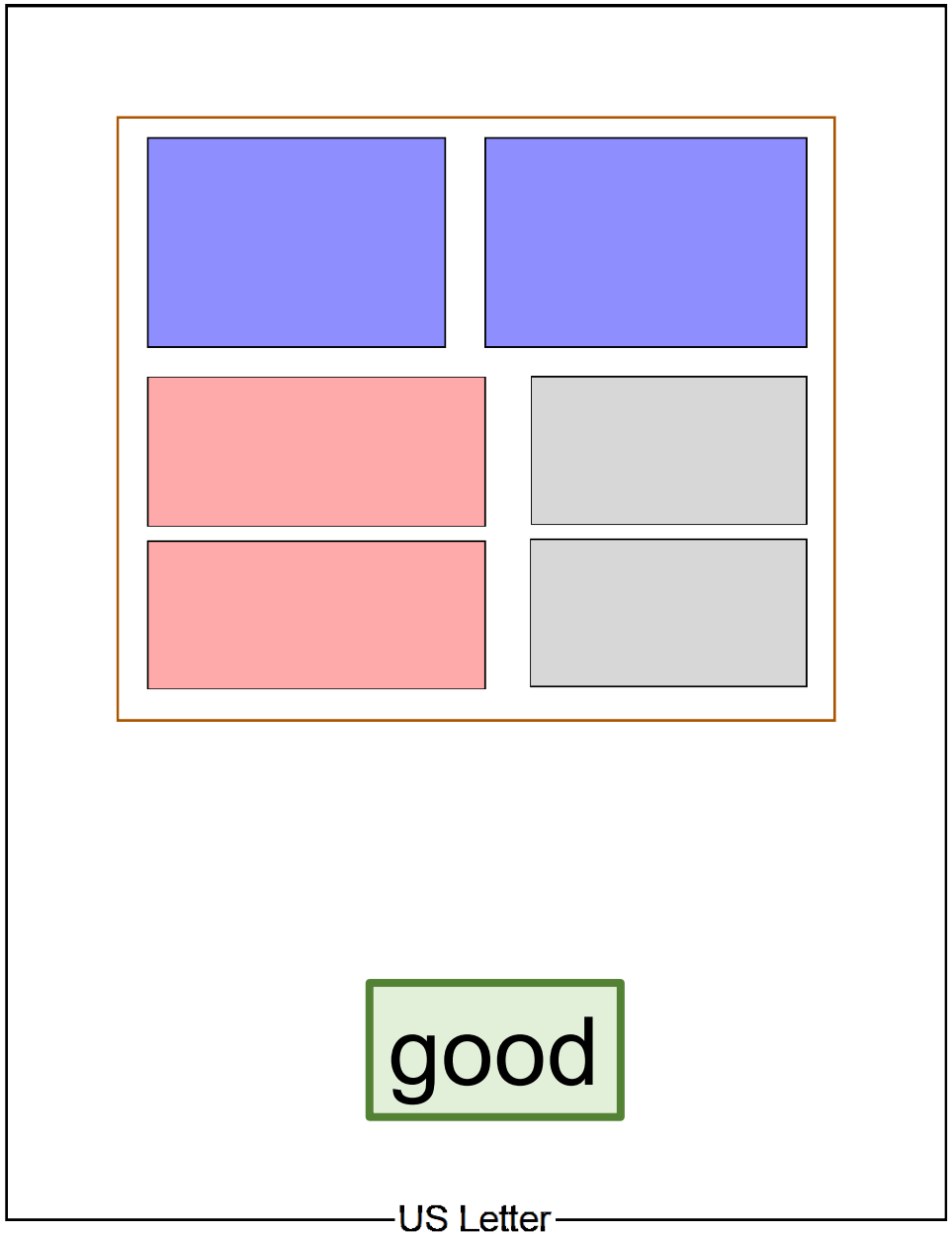
Use one font throughout, and use the same font size

scaling factor	
original	This text is in Arial 8 points
– 10%	This text is NOT Arial 8 points (really 7.2 points)
– 20%	This text is NOT Arial 8 points (really 6.4 points)
– 25%	This text is NOT Arial 8 points (really 6 points)
– 50%	This text is NOT Arial 8 points (really 4 points)

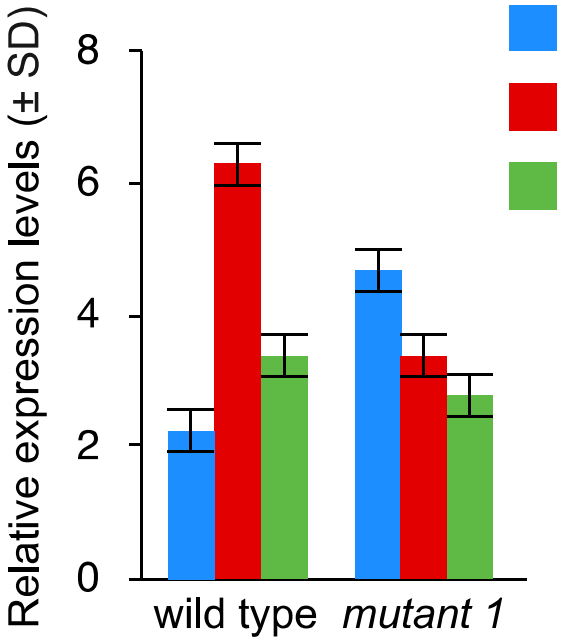
Especially important if figures are larger than the allotted width

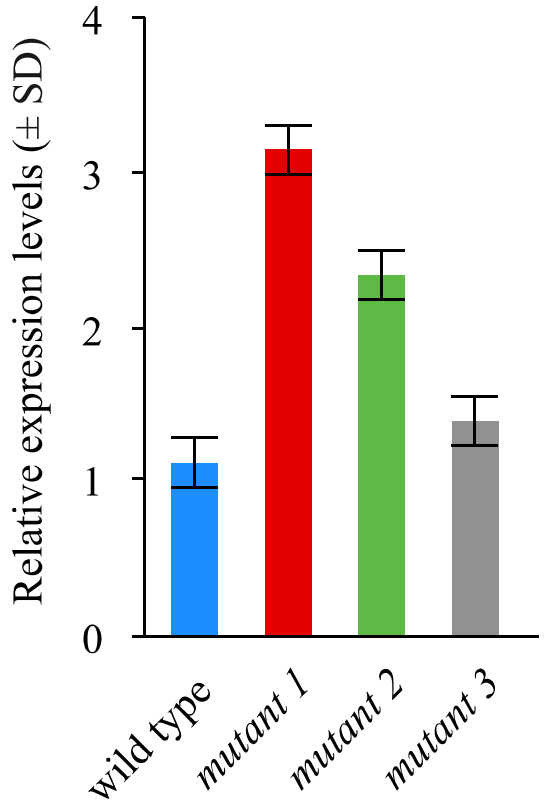
Next question: how and where to place panels?

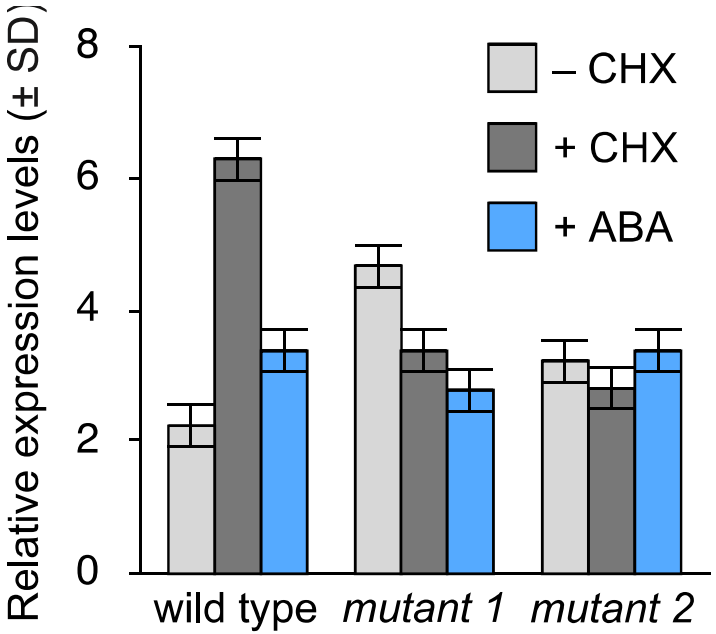


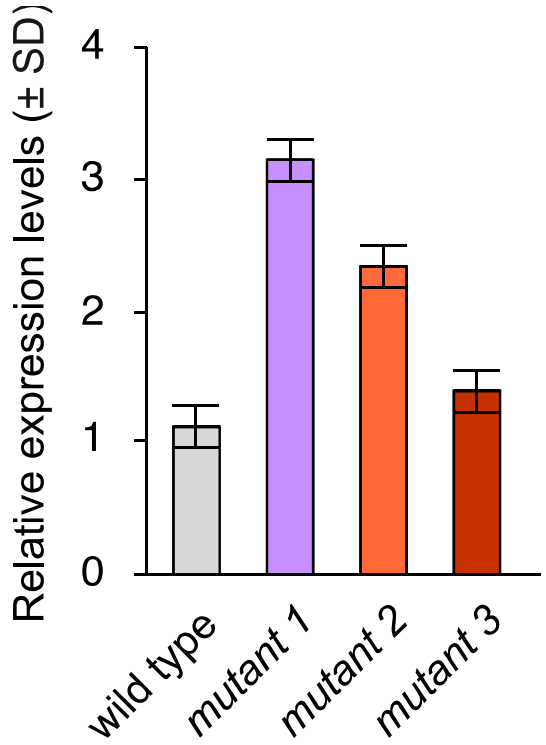


Matching styles across similar graphs



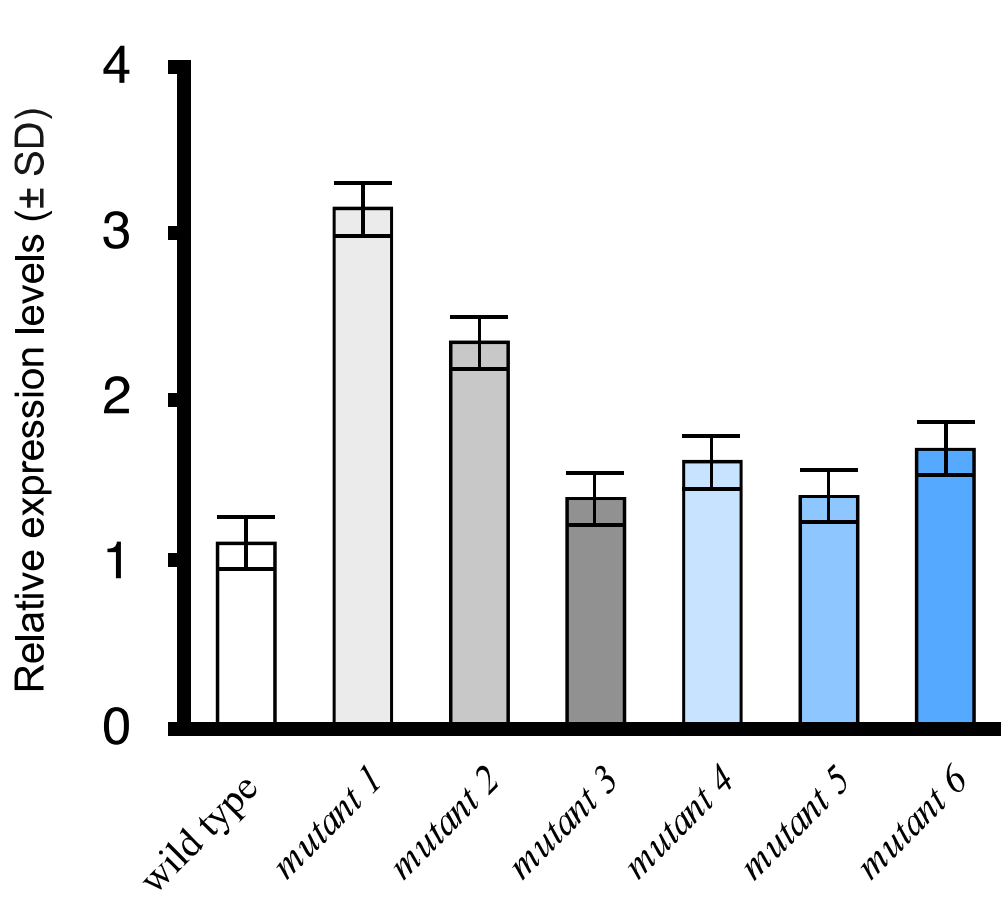


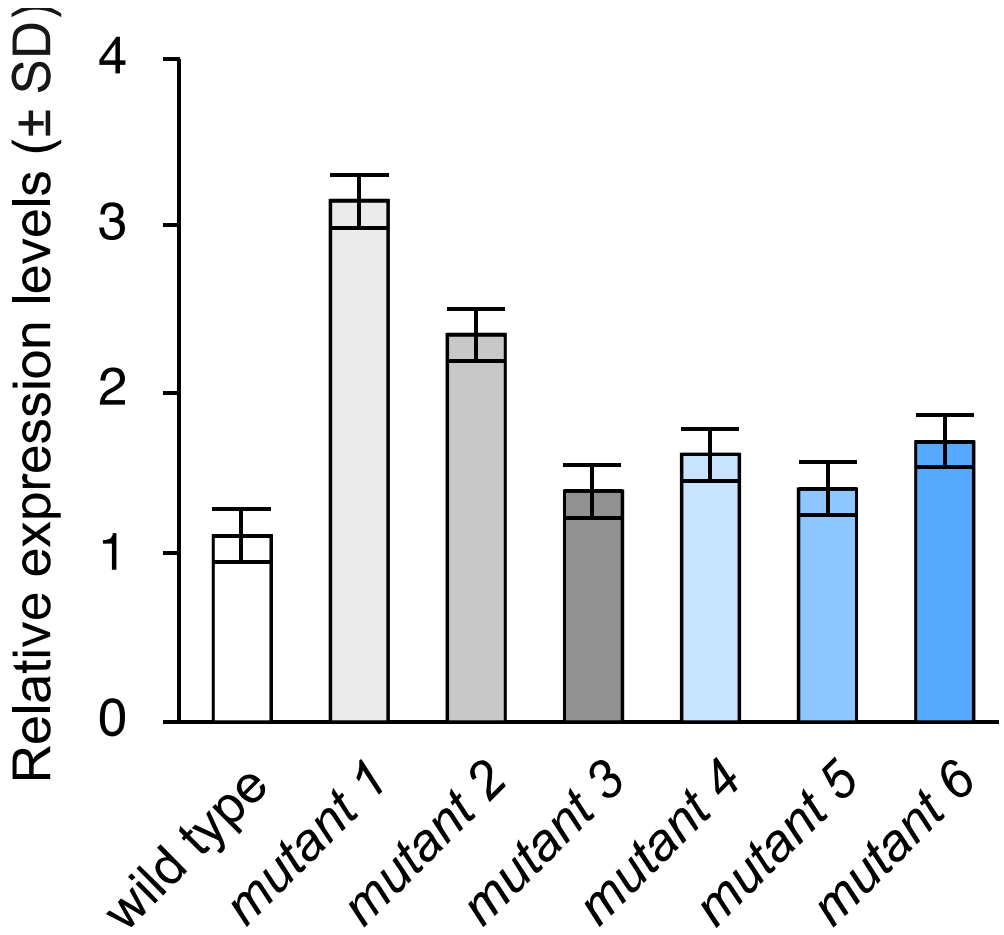




More efficient use of space

Axis thickness



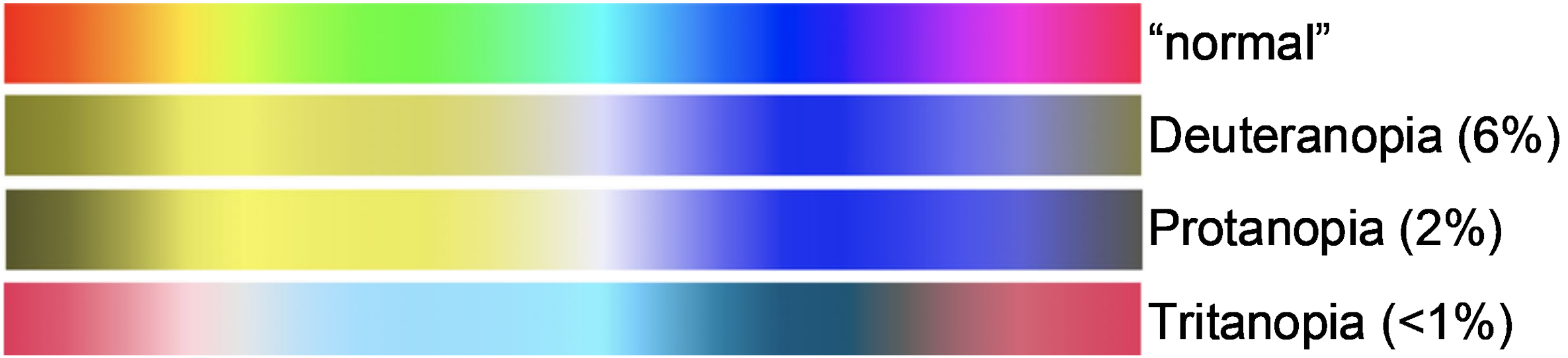


The data pop! Not the axes

Available color space: “normal” vs color blindness

“normal”

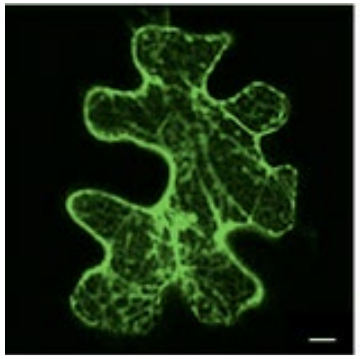
Available color space: “normal” vs color blindness



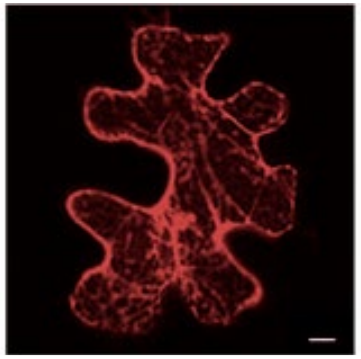
Microscopy images: red vs magenta and color blindness

“normal” vision

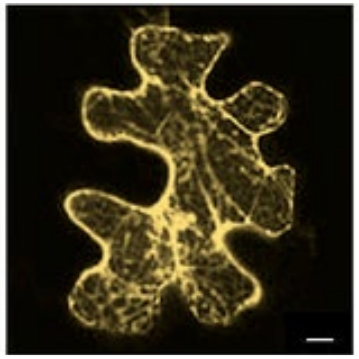
green



red

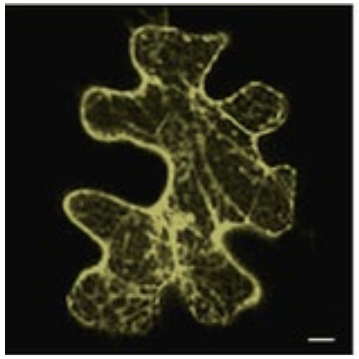


overlay

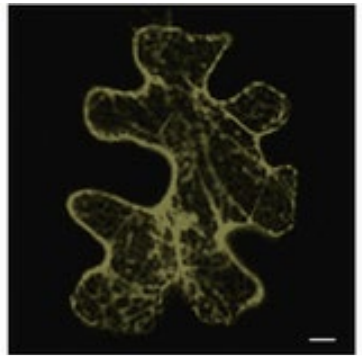


Deuteranopia/Protanopia

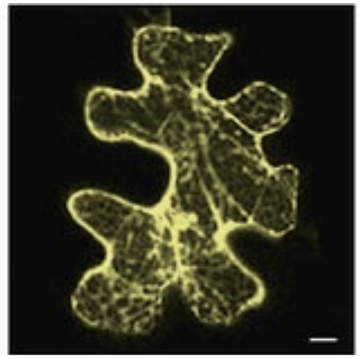
green



red



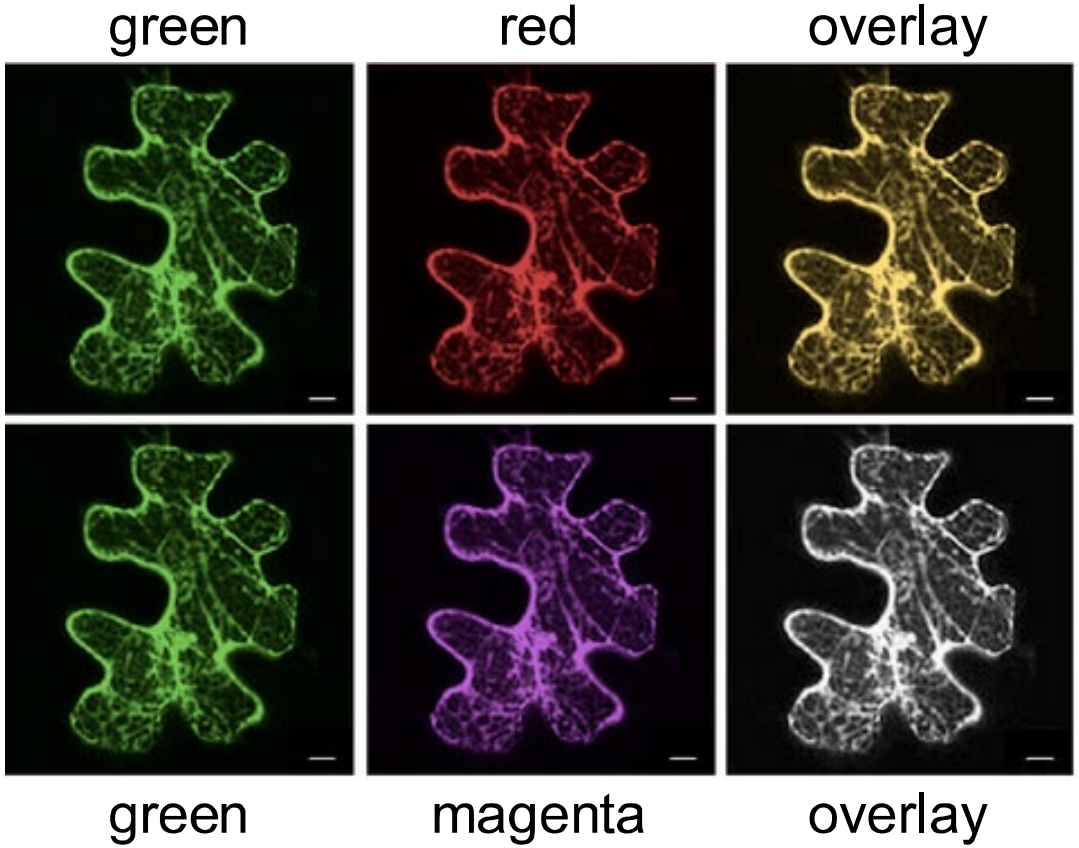
overlay



very limited distinction between red, green and the yellow overlay

Microscopy images: red vs magenta and color blindness

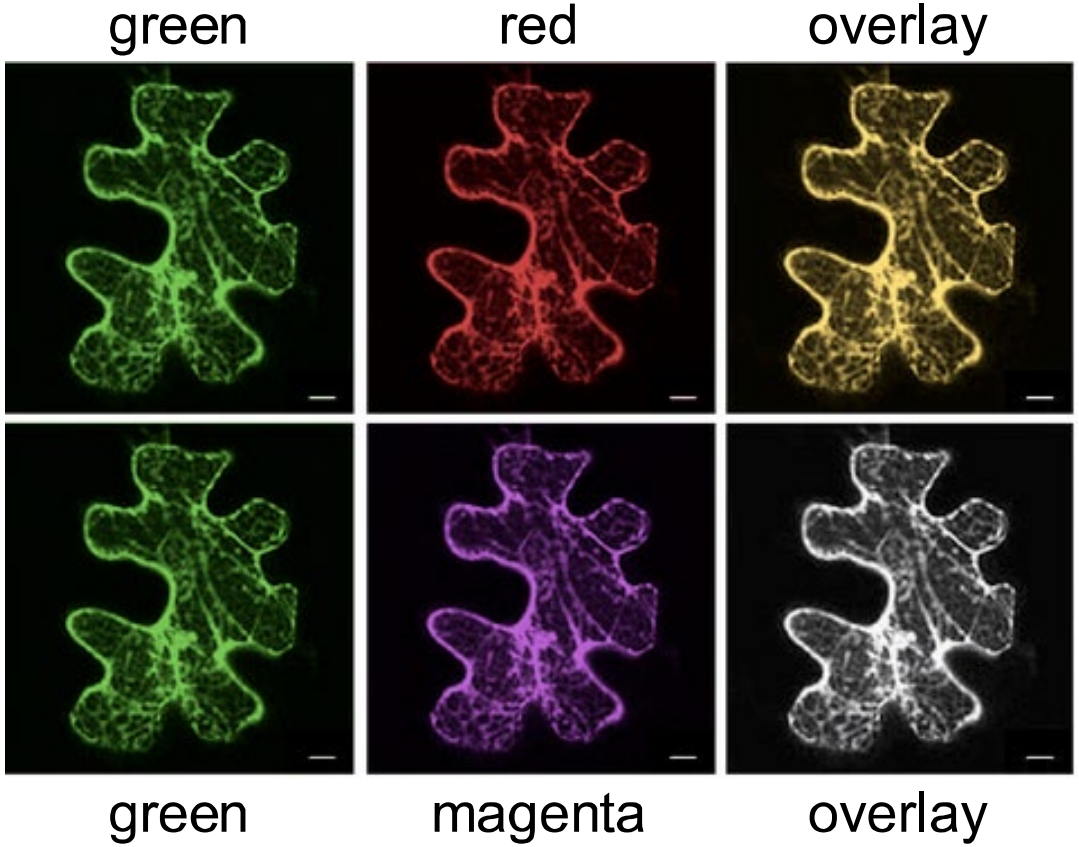
“normal” vision



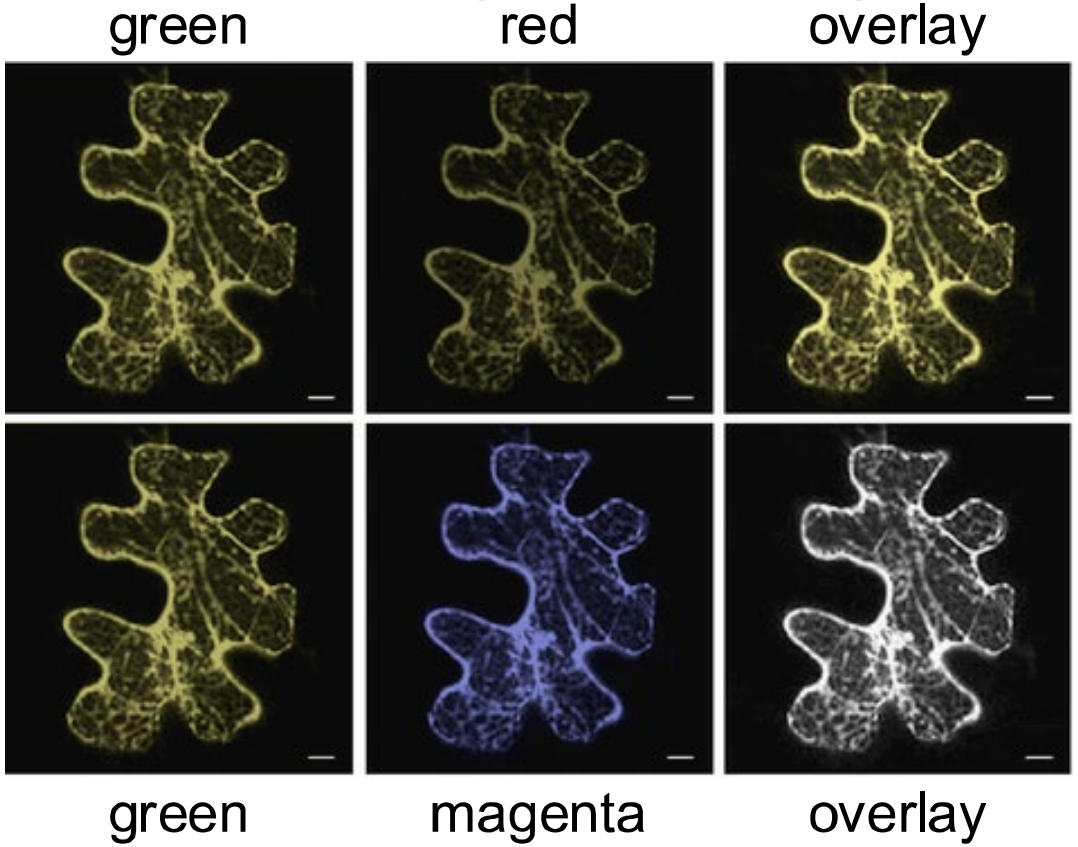
you can change the color by playing with “hue” in Photoshop (Affinity Designer, Pixelmator…)

Microscopy images: red vs magenta and color blindness

“normal” vision

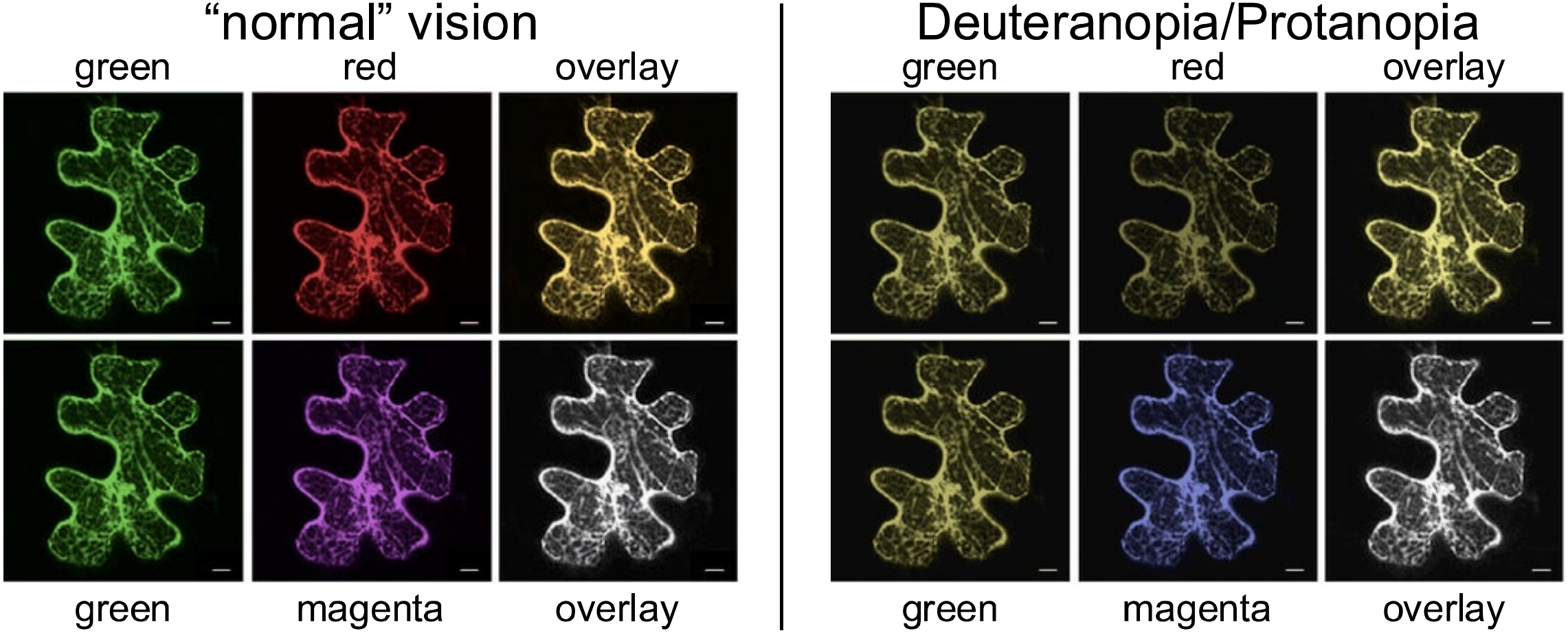


Deuteranopia/Protanopia



now, all channels are clearly distinguishable

Microscopy images: red vs magenta and color blindness



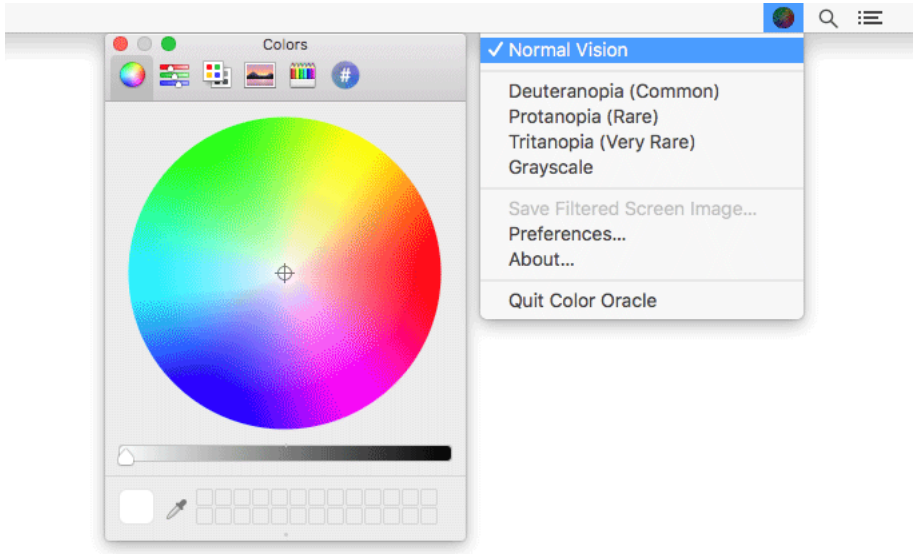
This is NOT data manipulation; this is data visualization

Microscopes do not “see” colors, they see grayscale images. The colors are added by the computer as a function of the laser and wavelength filters

Choosing colorblind-friendly color palettes

+ Color Oracle (http://colororacle.org)

Free download (for PC, Apple and Linux platforms)
Turns your entire display into what someone with color blindness would see



+ Coblis (https://www.color-blindness.com/coblis-color-blindness-simulator/)

Upload your file and select the type of color blindness

Colblindor

PDFs maintain text and element resolution

400 dpi

Hibiscus flower

100 dpi

Hibiscus flower

25 dpi

Hibiscus flower

PDFs save a set of instructions, not the elements themselves (unless it is a picture)

TIFFs save the entire image as a set of pixels (including the “empty” white space)

But not TIFF files

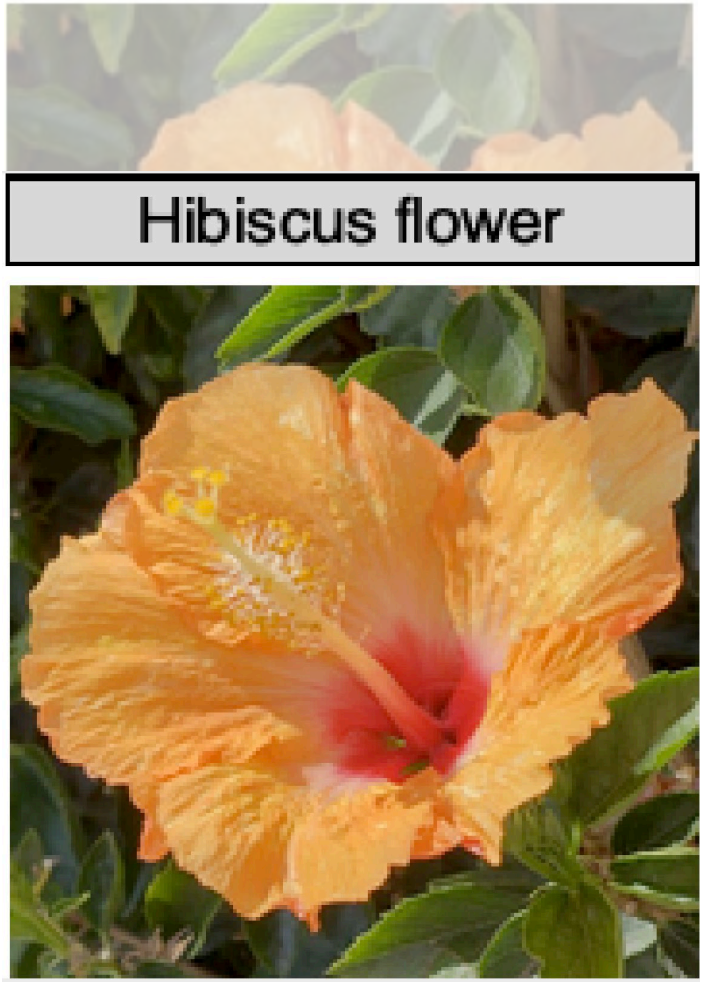
400 dpi

Hibiscus flower

Save TIFFs at high resolution with LZW compression

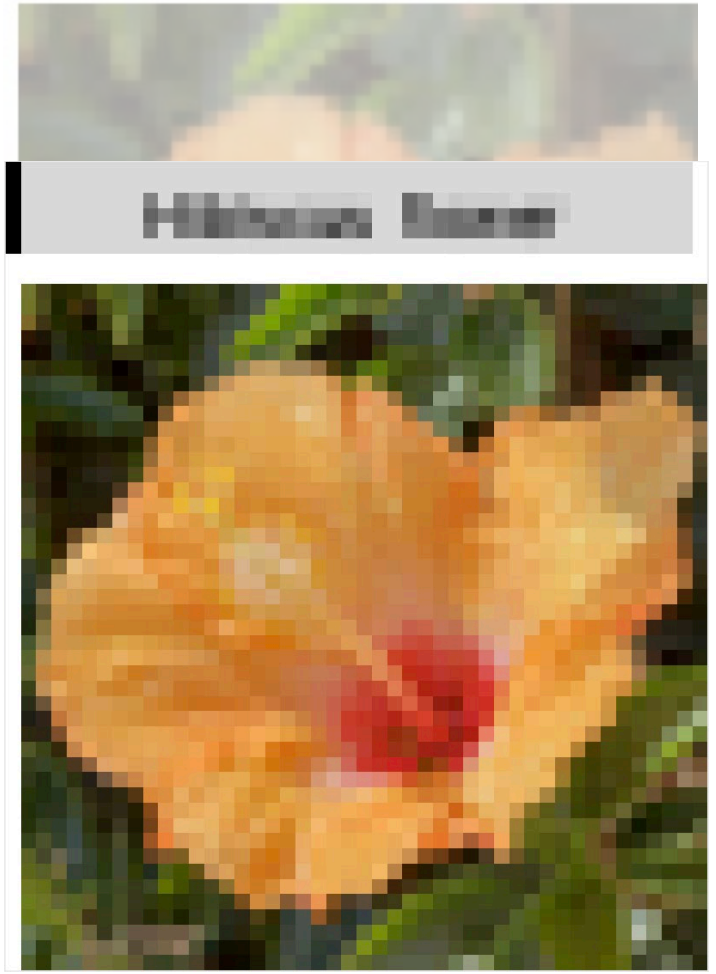
100 dpi

Hibiscus flower



25 dpi

Hibiscus flower



Further reading…

https://socviz.co/index.html#preface

https://serialmentor.com/dataviz/color-basics.html

https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1003833

https://journals.plos.org/plosone/s/figures

https://www.aje.com/dist/docs/Guide-Creating-Effective-Scientific-Figures-for-Publication.pdf

https://bioinformatics-core-shared-training.github.io/effective-figure-design/DesigningEffectiveScientificFigures_Practical_INKSCAPE_Zabala_v00.pdf

https://help.tableau.com/current/pro/desktop/en-us/default.htm