

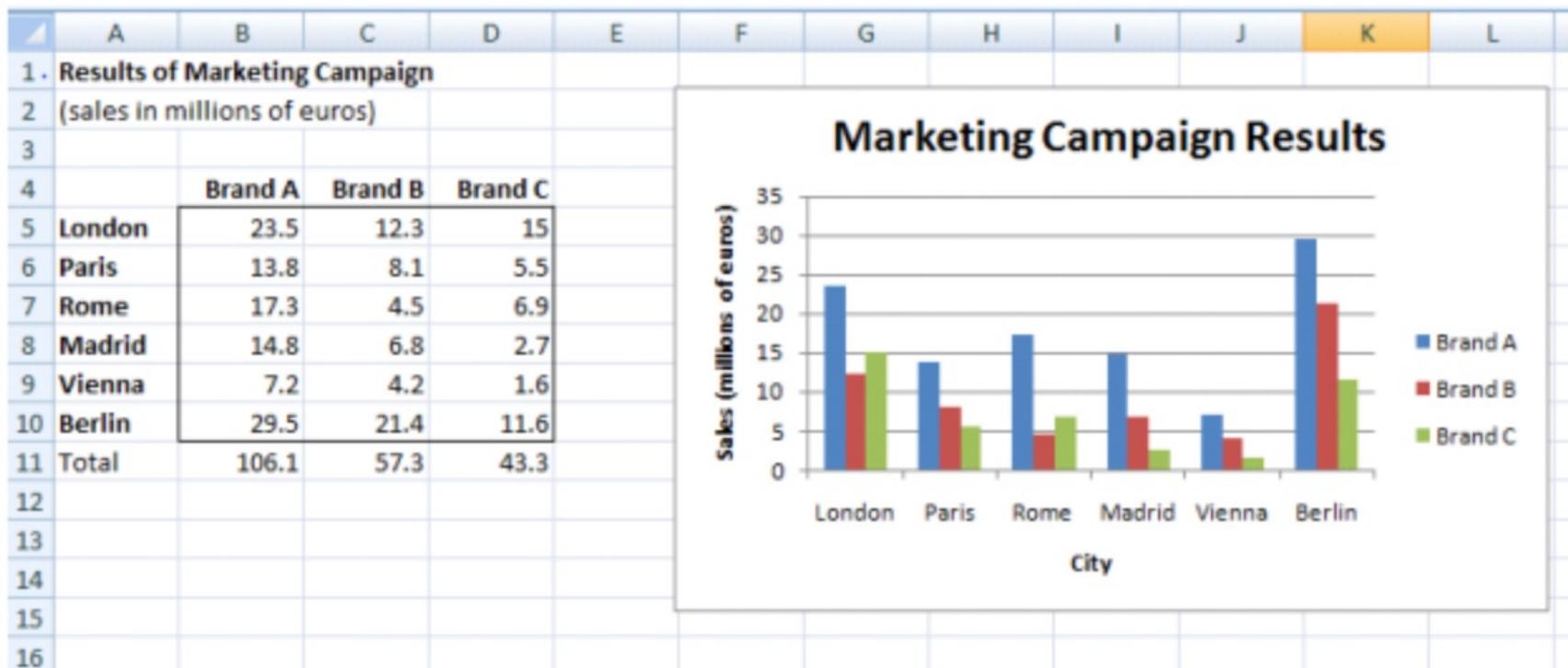
科技寫作(Scientific Writing)



Week 8 (Nov. 17 – Nov. 21)

Making Figures and Composing Captions

Are you still doing this?



Why I don't like it?

1. It is a convenient “quick” (which is very slow.....) preview tool that there is not much you can ask for. A preview-tool is not targeting publication-level quality.
2. Hard to share (not everyone can open .xml file).
3. Cannot process in a batched mode. Unfriendly if you want/need to work remotely.
4. Very time-consuming if you need to re-adjust multiple figures, e.g., due to updates of data or due to the requests of your referees or collaborators.

Do use programming languages to produce publication-quality figures

Nowadays, this is not hard.

Python 實作(Google Colab)
<https://colab.research.google.com/?hl=zh-tw>

<https://colab.research.google.com/drive/1ys5QQO3xpz7nro-27ISZmYXnI5992AZr?usp=sharing>



<https://colab.research.google.com/drive/1ys5QQO3xpz7nro-27lSZmYXnl5992AZr?usp=sharing>

請chatGPT修改code，在第一個Figure右側加上histogram

I am making a scatter-plot using the following Python code. Can you revise it, such that a histogram is appended on the right of this figure?

<https://colab.research.google.com/drive/1ys5QQO3xpz7nro-27lSZmYXnl5992AZr?usp=sharing>

請chatGPT修改code，把scatter-plot改成2D histogram

I am making a scatter-plot using the following Python code. Can you revise it to make it a 2D histogram instead?

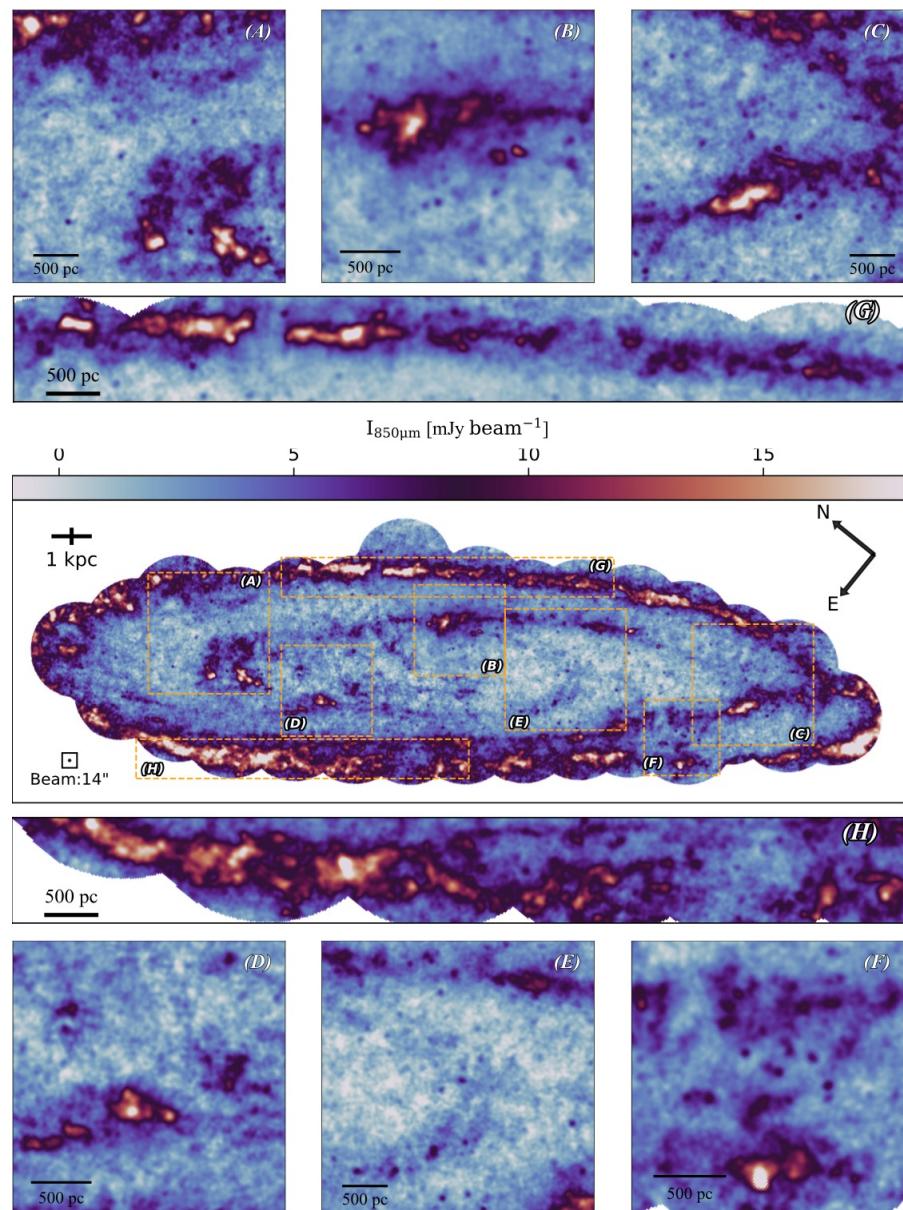
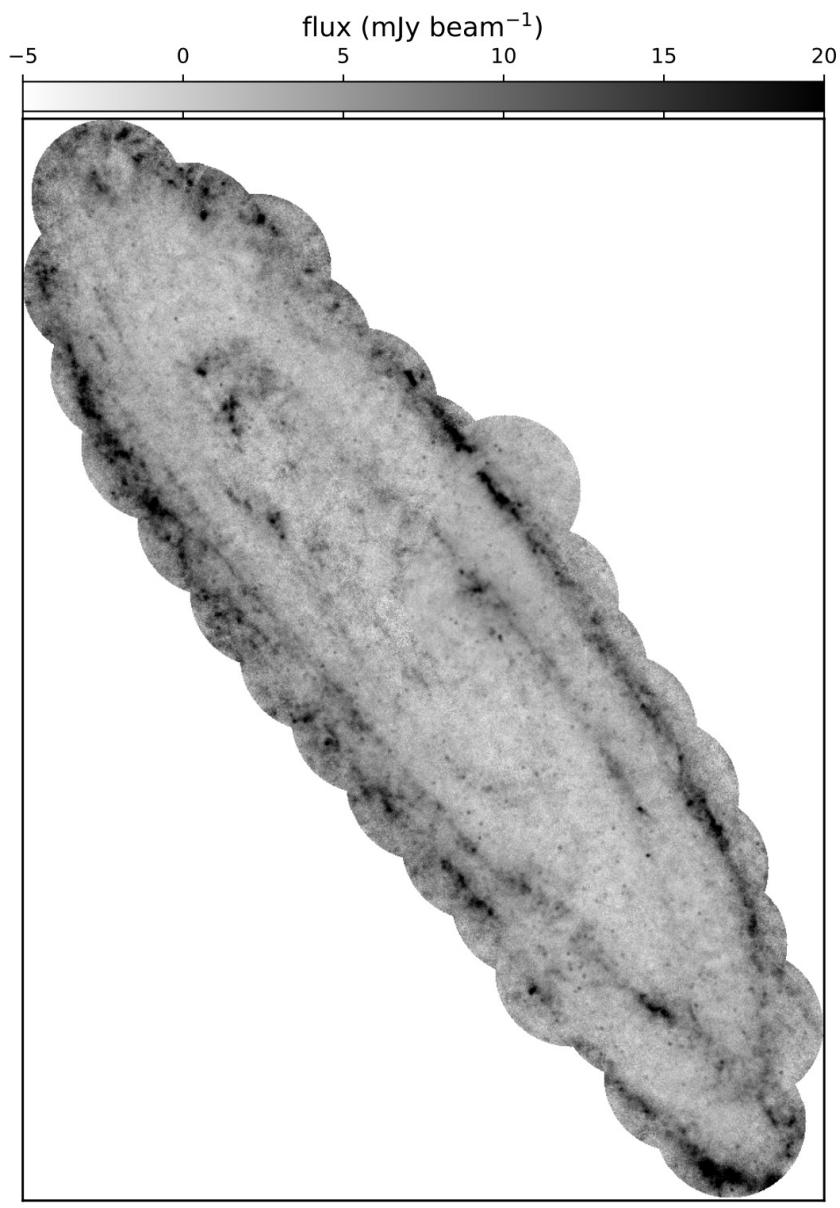
Manage multi-panel figures using the tabular environment of LaTEX

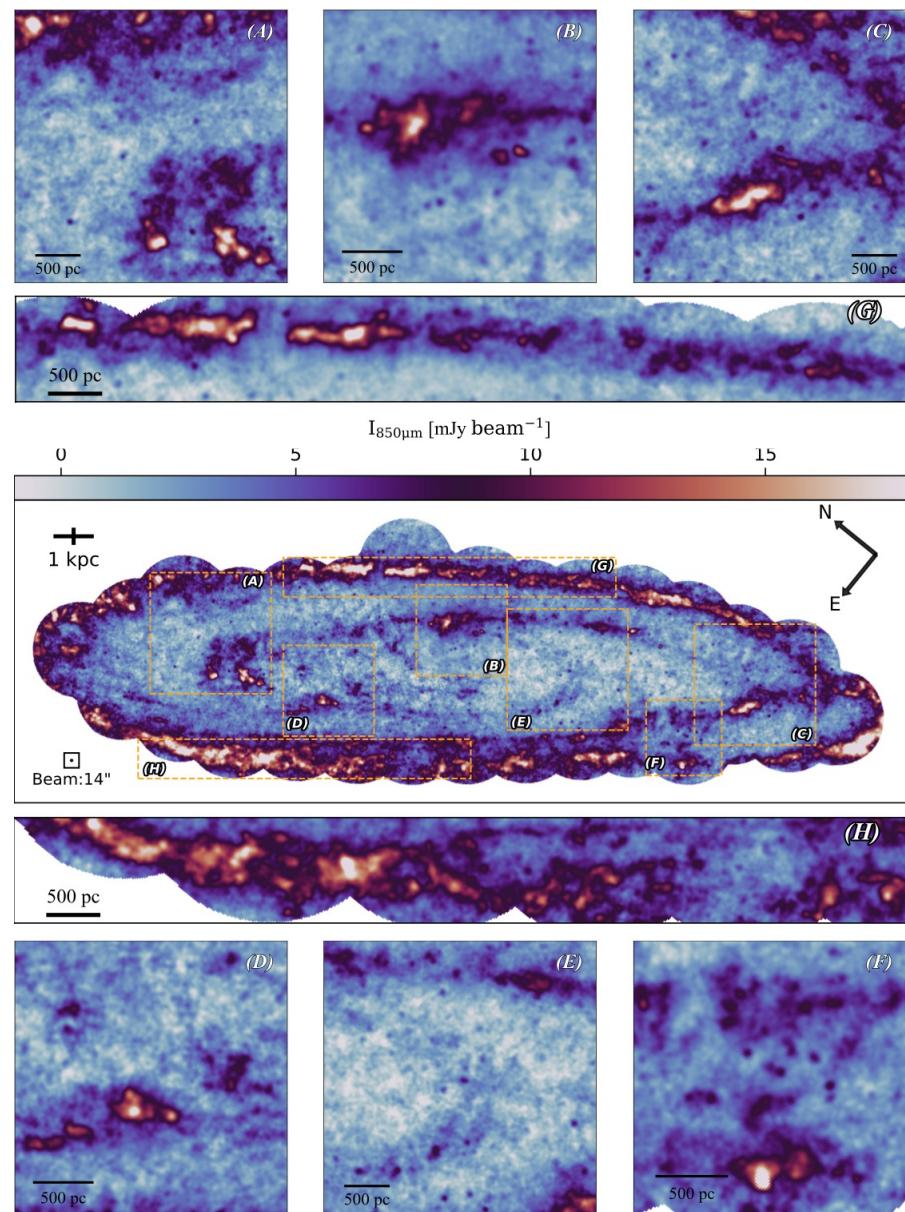
```
\begin{figure}
\begin{tabular}{ p{8cm} p{8cm} }
\includegraphics[width=8cm]{XXX.pdf} &
\includegraphics[width=8cm]{XXX.pdf} \\
\includegraphics[width=8cm]{XXX.pdf} &
\includegraphics[width=8cm]{XXX.pdf} \\
\end{tabular}
\caption{}\label{fig:multipanel}
\end{figure}
```

The very most frequent complaint to my students: "Your figures are ugly!"

What “ugly” means?







Data Visualization前checklist

1. 目的

針對不同的目的，選用最能凸顯目的的表示方式
(科學論文避免使用pie chart)

2. 讀者是誰? (適當labeling)

同實驗室者、同領域研究者、不同領域的物理學家(e.g., 獎項審核者)
大眾, etc

3. 期刊或論文格式要求?

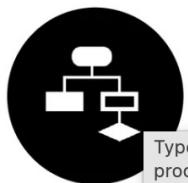
4. Style一致性(長寬比、色調、字體、symbol, etc)

同一篇論文，在多個圖中表示同一個或一類樣本的線條或symbols，盡可能用相同的符號以及類似的色調。避免readers在眼光由一張圖移到另一張圖時，要重新理解符號的意思，造成混淆或誤解。

目的 (<https://www.simplifiedsciencepublishing.com/resources/scientific-data-visualization-tools-and-techniques>)

1. 描述研究過程或邏輯
2. 比較某變量隨參數之改變
3. 比較差別
4. 建立相關性

描述研究過程或邏輯



Flow Chart

Types of data visualizations that explain a process or method



Diagram



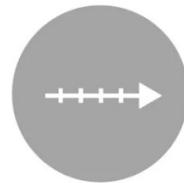
Infographic



Gantt Chart

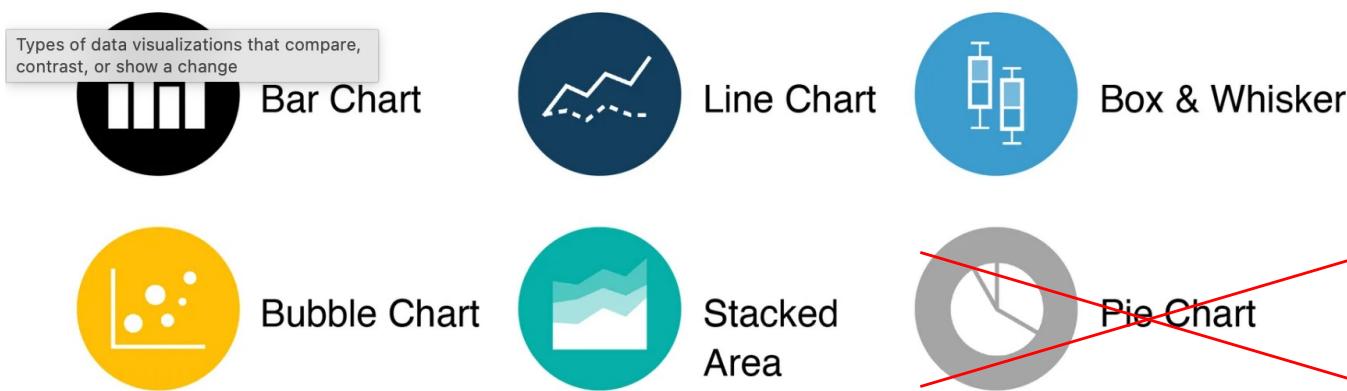


Illustration



Timeline

比較某變量隨參數之改變



建立相關性



Network Diagram



Heatmaps



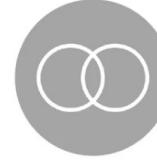
Maps



Radar Chart



Mosaic
Chart



Venn Diagram

Style-Color

1. 自然感覺 (e.g., 紅色->增加 [e.g., 股價上漲], 警示, 溫度; etc)
2. 色盲友善
(test it!
<https://projects.susielu.com/viz-palette>)
3. 使用多個顏色時考慮最重要的數據是否以最醒目的顏色表示，以及刺眼、紛亂等問題
4. Chatgpt can help you!
5. Try
<https://imagecolorpicker.com/>

Color code conversion
<https://www.rapidtables.com/convert/color/index.html>

The screenshot shows a ChatGPT interface with a user query and a generated response.

User Query:

Can you give me a list of 7 Python-matplotlib colors, which are blueish and sequential?

Generated Response:

Sure! Here is a set of 7 sequential, blue-ish colors sampled from Matplotlib's built-in "Blues" colormap. These are evenly spaced from light to dark:

Index	Hex Color	Description
1	#F7FBFF	very light blue
2	#DEEBF7	pale blue
3	#C6DBEF	light blue
4	#9ECAE1	medium-light blue
5	#6BAED6	medium blue
6	#3182BD	strong blue
7	#08519C	dark blue

These come directly from the standard `Blues` colormap gradient and are ideal for sequential and blue-themed plots.

If you'd like, I can also:

- generate RGB tuples,
- show how to sample them in code, or
- give darker/lighter/alternative blue palettes.

Just let me know!

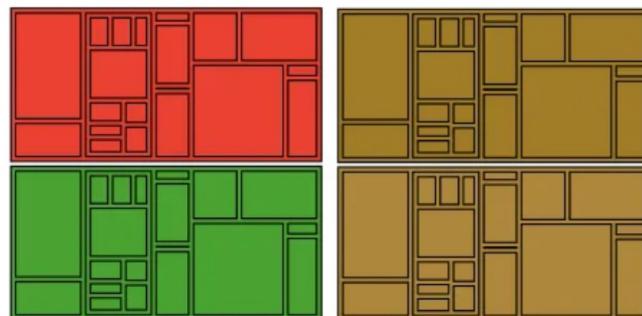
At the bottom right of the interface, there are small icons for navigating through the conversation.

Color Blind Friendly

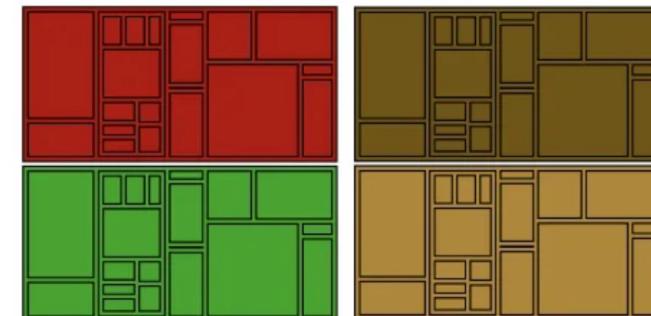
<https://www.simplifiedsciencepublishing.com/resources/best-color-palettes-for-scientific-figures-and-data-visualizations>

Red/Green Color Deficiency Test

Red/Green Conflict



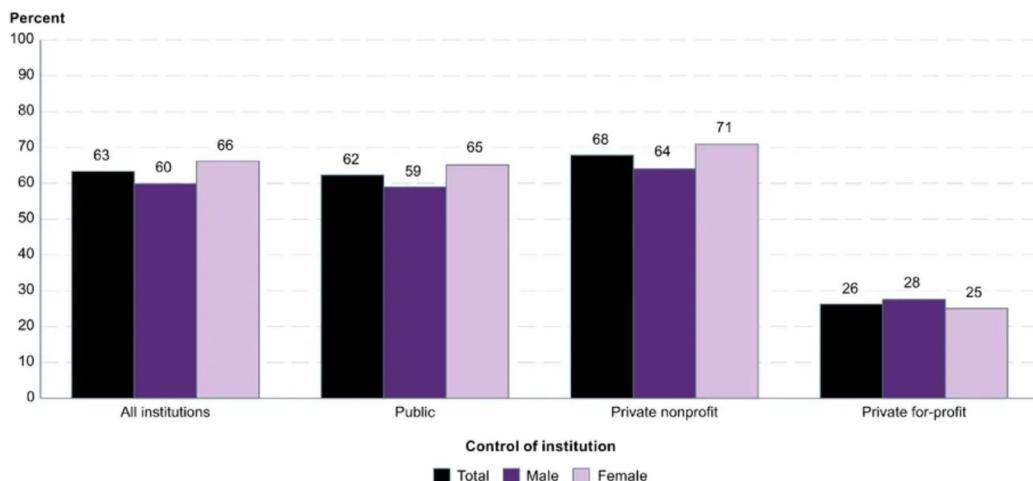
Red/Green No Conflict



Use color(s) to highlight the most important part of your data

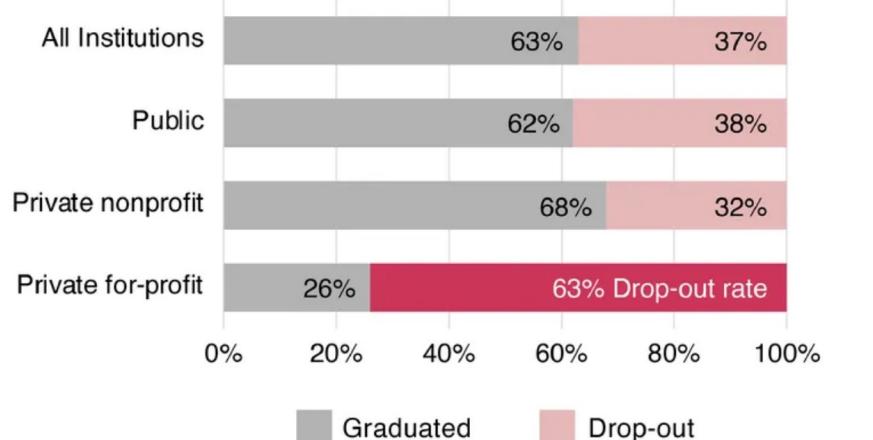
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Graduation Rate for Bachelors Degree



Source: National Center for Education Statistics
<https://nces.ed.gov/fastfacts/display.asp?id=40>

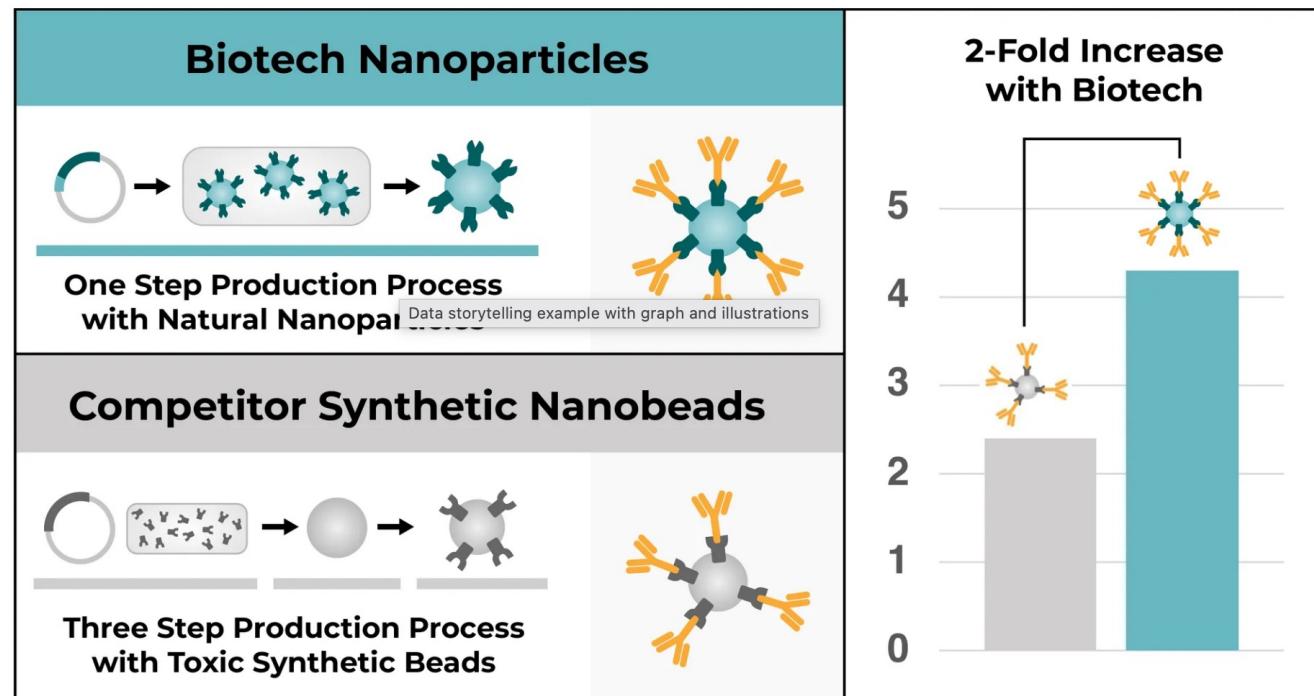
Private For-Profit has Higher Drop-Out Rate



Simplify the data story with 1-2 highly contrasting colors that highlight your main point

Use composition (and color-highlighting)

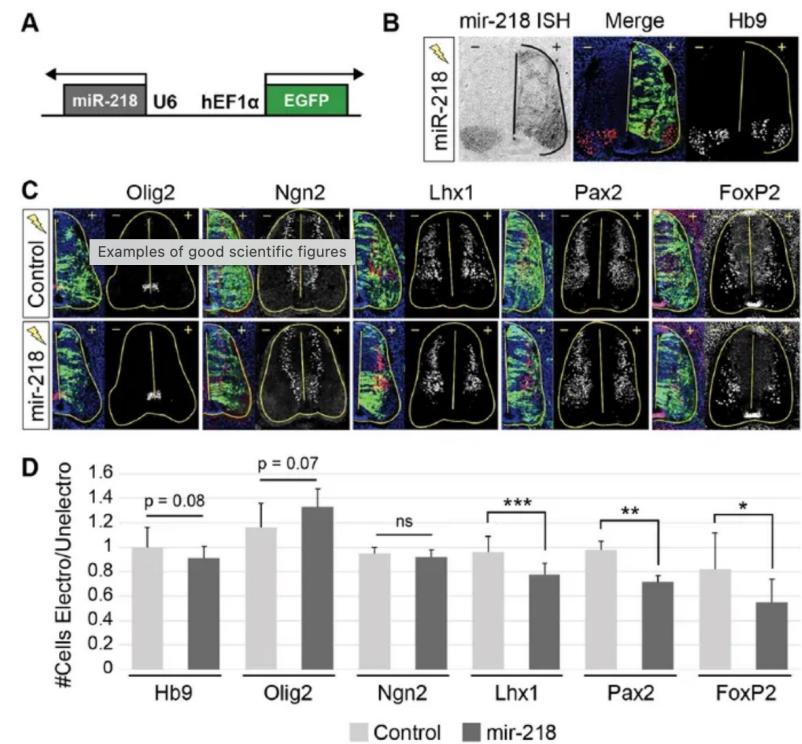
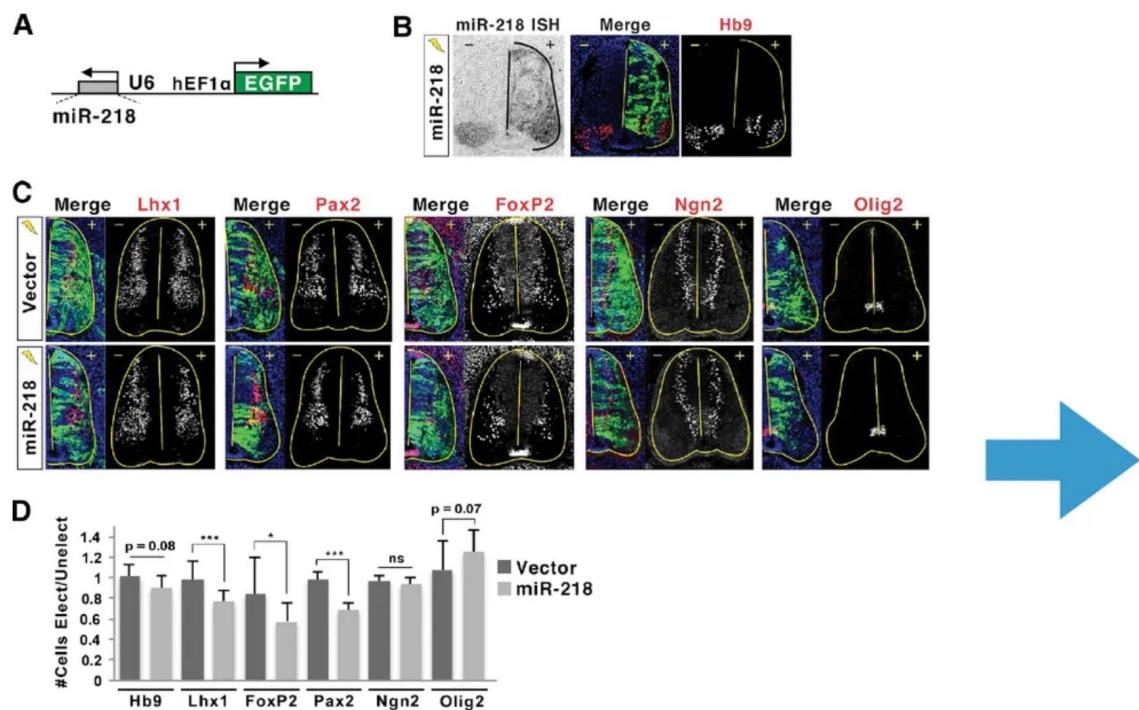
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Full Data Storytelling Example

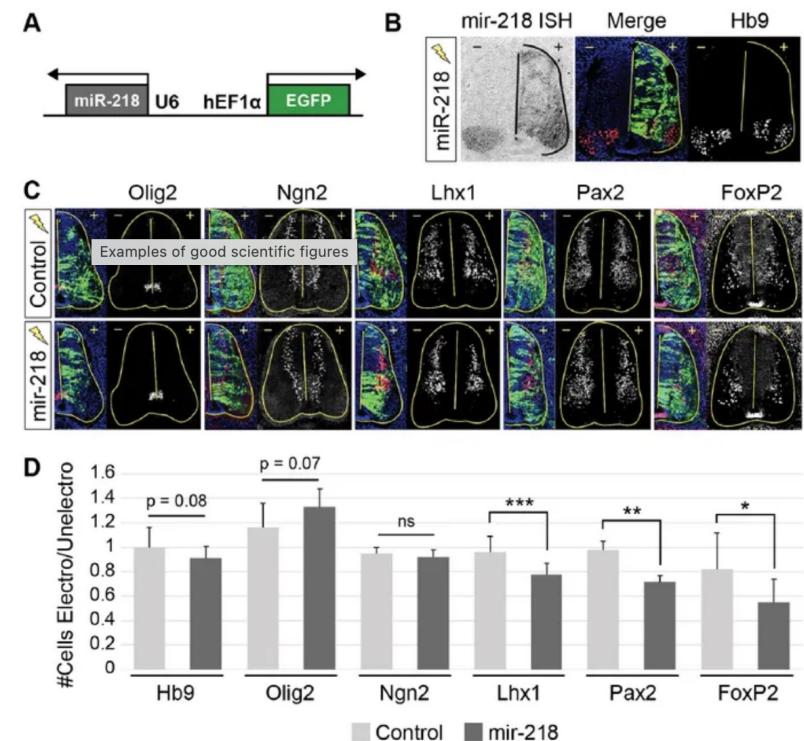
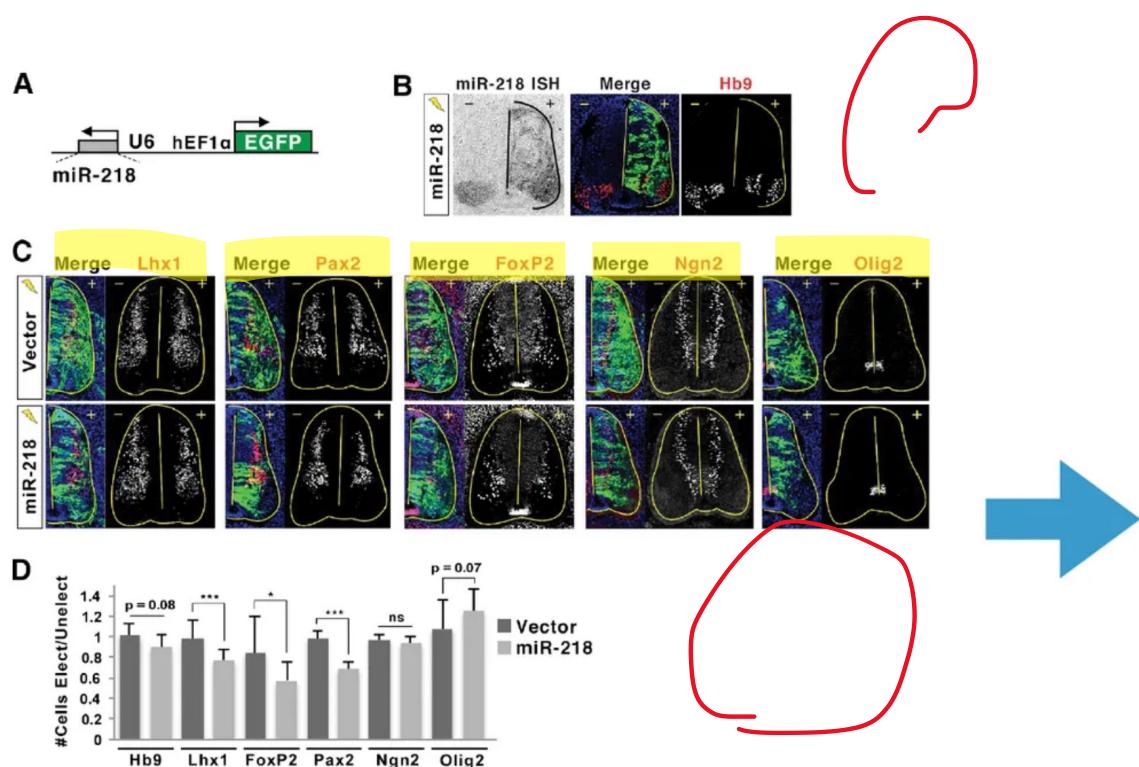
Layout (移除不必要資訊，避免無意義大空)

<https://www.simplifiedsciencepublishing.com/resources/best-color-palettes-for-scientific-figures-and-data-visualizations>



Layout (移除不必要資訊，避免無意義大空)

<https://www.simplifiedsciencepublishing.com/resources/best-color-palettes-for-scientific-figures-and-data-visualizations>



<https://www.youtube.com/watch?v=i-HAjex6VtM>