

Visualizing Data	Tools to explore
<p>Important Suggestions</p> <p><u>See this website from Google!</u></p> <p>Improve Data-to-Ink Ratio: “Is this [shape] necessary?”</p> <p>Ensure Visual Quality: “Is this geometry telling the truth?”</p> <p>Reduce Clutter: “Is this color choice or layout necessary?”</p> <p>Increase Efficiency: “Is it too hard or time consuming to read?”</p> <p>Consider Accessibility: “Is this colorblind safe? Is the font size large enough?”</p> <p>Organize and Guide: “Should I regroup my data? Can I add helpful text?”</p>	<p>General utilities: matplotlib, seaborn, ggplot2(R)</p> <p>Volumetric Data: ParaView, VisIt</p> <p>Web-facing: D3.js, x3dom, Bokeh, Plotly, WebGL (three.js), shiny, datawrapper</p> <p>General Interactives: Processing, OpenGL</p> <p>Artist Tools: Photoshop, Illustrator, Maya, Blender, ffmpeg, Image Magick</p> <p>Mapping : NASA World Wind, cartopy, basemap</p> <p>You can find some examples and further information here : https://github.com/ageller/IDEAS_FSS-Vis</p>
<p>Distinguishing Measurements</p> <p>From easier to harder for reader to distinguish differences</p> <ol style="list-style-type: none"> Position: e.g., x,y location, height of bar graph 1D Length, 2D Area, 3D volume: e.g. pie charts, stacked bars Orientation: e.g., multiple line plots overlapping Temperature: e.g., monochromatic color schemes 	
<p>Visual Encoding of Data</p> <p>Tools to utilize to distinguish between categories and/or highlight specific data (multiple encodings are OK, and sometimes very helpful)</p> <p>Color:</p> <ul style="list-style-type: none"> Use colorblind safe colors, e.g. see colorbrewer2.org and viz-palette and google's suggestions Colors carry meaning (e.g., red = bad & green = good, or dark = lots & light = few) Less colors are usually better; use sparingly to highlight important data <p>Shape:</p> <ul style="list-style-type: none"> Symbol shape is more powerful than symbol size in distinguishing between data sets Consider using shape with color and/or line styles for multiple encodings Are your shapes easy enough to distinguish? (circle vs. square is easy, hexagon vs. pentagon is harder) Do your shapes allow for the precision your plot requires (are they too big/small? If you are using a bar chart, make sure the top is flat!) <p>Text & Legends:</p> <ul style="list-style-type: none"> Increase the font! Most default font sizes from plotting tools are too small to read easily. Will it help to move a label/legend onto the figure to label points directly? (often the answer is YES) Should you reduce/increase the number of labels on the x or y axes? Do you always need both axes? (e.g., a bar chart could simply have one axis with values written inside the bars) Try not to rotate text anything other than vertical or horizontal 	
<p>Common Chart Types in Astrophysics</p> <p>Often used: scatter, line, bar (histogram), contour, heatmap</p> <p>Rarely used: pie, 3D plots, stacked histograms, network diagrams</p> <p>Static Formats: .pdf or .eps is required for most journals</p> <p>Interactive Formats: AAS journals allow x3dom, Bokeh, blink, or astropy.timeseries</p> <p>See the AAS graphics information</p>	