

## Homework Assignment #9, Evaluating Figures and Captions

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Effective figures and captions are vital for communicating scientific work in meaningful, memorable, concise ways. Unfortunately, many figures and captions published in scientific articles are less than ideal. The purpose of this assignment is to give you practice in critically evaluating figures and captions so that you will be better able to design your own.

To prepare for this assignment, first read Chapter 9, “Graphics and Their Place,” in Scott Montgomery’s *Chicago Guide to Communicating Science* (Chicago, University of Chicago Press, 2003), which is [posted on the course website](#). Montgomery provides a list of seven criteria on which to evaluate figures. First, [find the criteria and write them down](#) to guide you in doing the rest of the assignment.

Next, go back to arXiv.org and select a topic that you’re interested in; then click on “Recent” for a list of recent papers. Select several papers that sound interesting and click on the “Download PDF” link to see the full papers.

This homework assignment consists of several steps. Do them all to obtain full credit:

1. Read the Montgomery chapter. On the first page of your homework submission, write down the seven criteria he describes to evaluate the quality of a figure.
2. Select one “bad” figure\* and one “good” figure from the arXiv articles that you examined. Copy and paste the images and captions from the article into separate pages in your homework document, and be sure to label which figure is the good figure and which is the bad. Provide full bibliographic citations (authors, title, manuscript number, and year) for each figure.
3. Write a brief critique (two to three paragraphs) for each figure and caption, using the criteria in the Montgomery book and the lectures presented in class, and justify your evaluations by giving specific examples. Explicitly address the seven Montgomery criteria for the figures and the lecture notes for the captions.

We’ve provided a [famous example](#) from Edward R. Tufte’s classic, *Visual Explanations: Images and Quantities, Evidence and Narrative* (Cheshire, CT, Graphics Press, 1997) to show how figures can be improved to communicate the maximum information clearly and compellingly. (You don’t have to analyze the Tufte figure—just note how he improved the quality and quantity of information conveyed from the original National Center for Supercomputing Applications’ figure.)

Due: **Friday, October 27, 9:00 p.m.** Upload your assignments in one file to my.physics. Assignments submitted after the deadline will have points deducted and will be ineligible for rewrite points.

Total—100 points (25 points each for the suitability of your two examples and 25 points each for your written analyses of each figure and caption).

\*For a particularly germane example of a horrible figure, in my opinion, see Fig. 4 in <https://arxiv.org/pdf/2108.07101.pdf>. Quickly, which is the “blue” line and which is the “violet” line? Which is the red line, and which is the orange? What information can you derive from the figure if you print the paper out on your trusty black-and-white printer?