

**FCH 797**  
**Fall 2005**

**1) *Goals of this course and selection of a paper to talk about***

I presume that your talk is going to be centered around one paper, although you may need to look at other papers for background. The paper you select should meet one of the following two criteria:

- 1) be important and exciting to you
- 2) seem to be, or clearly be, in error

One consistent goal of this course is to help you learn to give better presentations. That is why I want to see your Powerpoint presentation ahead of time! I want to point out, however, that I have goals beyond improving your presentation skills. Usually, when I teach this course, my main focus is to have you and the rest of the audience (including me!) learn about interesting, important, and relevant new science (see criteria #1, above)

This year I had the idea to have you look for errors or potential errors in published papers. This is a critical ability for a scientist, but it is very difficult for a new graduate student: you need to read a few dozen papers on a topic and gain certain skills and a sufficient knowledge base before you can do this! So I expect most of you will be picking papers to fulfill criterion #1, above.

Another barrier to detecting errors is *attitude*. You need to realize that the published literature contains mistakes, *and* that you have the ability to detect potential and actual problems in the literature. We will work on these issues a little bit in our second meeting.

Once you have the knowledge base and confidence to correct other people's work, you are in a much better position to detect your *own* mistakes. The ability to detect your own mistakes will save you time, energy, and embarrassment, and make you a much better scientist!

*"The first principle is that you must not fool yourself - and you are the easiest person to fool."*

- Richard Feynman, Nobel Laureate in Physics, Caltech commencement address, 1974.

**2) *Finding the erroneous or suspect paper***: For the senior graduate students, and the ambitious among the rest of you, here are some ideas for finding a paper to criticize.

- a) You may already have found one in the course of your research. Great!
- b) Ask your advisor for a topic (e.g., measurements of environmental Hg) which is notorious for artifacts.
- c) Ask for a name of a senior researcher whose work is often suspect.

**3) *Criticizing the paper*** :

How important are the conclusions (if they were correct)?

Ideally you can do (a), but more likely (b)

- a) Can you show convincingly, from the results in the paper itself, or by comparison to other results or by calculation, that there is an error in their procedures, calculations, results, or conclusions?
- b) Can you point out inconsistencies that make you suspect the results or conclusions?