

Fundamentals of Nanoscale Science and Engineering Class Research Project

The primary written assignment for this course is the preparation of a short paper that explores the “state of the art” in some area of nanoscience or nanoengineering. Topics must examine some aspect of (i) nanoscience; (ii) an engineering or tools issue, or (iii) the societal implications of nanotechnology. This is your chance to pursue and explore the issue that has most captured your attention. We do not intend to assign topics. Pick an issue about which you are curious to learn more. You will need to narrow the subject a little. For example, if you are interested in the tools used to conduct work at the nanoscale, you should pick one, rather than try to cover them all. Rather than talk about "nanotechnology", you should pick a particular type of application. Rather than "nanomaterials", for example, try to focus on a specific category or type of nanomaterial. You may not be able to focus right at the beginning of your research – but the chapters in Ratner and Ratner should help. You certainly will need to narrow your focus by the time you begin writing.

Content:

We expect you to tell us about the current state of work in your chosen area. Among the questions to think about are these:

- What is happening now in terms of nano work?
- What are the scientific or engineering challenges facing researchers?
- What are the prospects of actually solving those challenges?
- What tools are required to advance nanoscale work?
- In addition, EVERY paper must include a section that discusses the societal implications of the particular field under review.

Topic Selection:

You should submit a topic to the instructors during class on March 1, on the back of our "Most Memorable Point" sheet. We want to make sure your topic fits into the framework of this class. We also may ask for minor adjustments to limit obvious duplications

Style sheet:

Length:

Paper must be 4-6 pages double-spaced, 11 or 12-point font. (1500-2000 words).

Sources:

You must draw upon at least 3 sources *in addition to* the Ratner and Ratner volume; it will not hurt to use more. Information may be drawn from the web, but we strongly recommend that you be selective and critical of the sources. The best information will come from scientific and professional journals and peer-reviewed publications – in print or on-line. Web sites should be those developed by recognized organizations such as professional societies (American Chemical Society), universities, or research organizations like the Foresight Institute or the National Science Foundation. Sometimes general science and engineering journals such as

Technology Review, *Scientific American*, or *Chemical and Engineering News* will offer good overview articles; you can find research papers in *Science*, *Nature*, and specialized research and professional society journals. **A preliminary list of your sources should be turned in on March 15.**

Style of citation:

As in any formal paper, you must use references to indicate the sources from which you have drawn your information. You may use a parenthetical style in the text (Seely, p. x), with a list of references at the end of the end. Or you may use formal footnotes. The style is less important than the idea of making clear where you got your information.

Bibliography: All papers must include a list of the sources you used.

This paper will be worth 40% of the course grade.

Academic integrity:

There are so many topics that we see little reason to worry about overlapping, but we will absolutely expect to see original work in each project. This is a not an assignment where collaboration is acceptable. It is also inappropriate to copy extensive work from someone else. Please be certain to use quotation marks to indicate any materials from other sources – and remember that paraphrased sources (those not quoted directly) still should be referenced. If in doubt, add a reference.

Due Date:

You should turn papers in during class in Week 13 (April 10). You should be prepared to make a short presentation (~5 minutes) on your topic in class April 10 or April 12.