The projects will start after Lab #5. You should choose a problem where SEM/TEM would provide compelling input, e.g., a microstructure issue related to surface morphology, size/shape/distribution, or crystallography/diffraction, nanoscale assembly, possible local chemistry etc. It is of course expected that SEM/TEM will be the focus of the project. You should work in groups of 2, the most natural groups being your lab groups.

Grading of the projects will be based upon a combination of the degree of difficulty as well as how well presented and analyzed the results are. Note the emphasis on degree of difficulty; if you choose a very easy project do not expect high marks. It is predictable that at least one group will not obtain what they expected or wanted – not due to a lack of trying but because the results turned out to be different from what was expected. Provided that a good presentation and analysis is given this will not mean a low mark for the project, it could mean a very high mark.

A one page description of your proposed project is due April 28th electronically. This need not be detailed but should contain:

a) The group members

b) A one paragraph description of what you propose to do

c) A brief description of what instruments (SEM/TEM) you will need

d) A brief risk assessment of what could go wrong and how you will proceed

Contents of Report: 15 Pages maximum including (readable) figures, due by 17:00 Thursday June 9th. Suggested structure is:

1. Statement of purpose - define the nature of problem and how SEM/TEM would help solve it. This should not be more than 2 pages.

2. Approach+Experimental Details, not more than 2 pages

3. Results

4. Discussion - where I seek critical evaluation of whether you are successful in your original purpose, and whether you have learned differently in the process etc.. roughly 2-3 pages

Note: often brevity wins -- it makes it easier for me; waffle without purpose will lose you marks.

Example Projects:

1. Use SEM to compare the structure of different types of tights (this works).
2. Use TEM to look at the UV blockers in different type of cosmetics.
3. Use TEM & SEM+EDX to look for inorganic additives in artificial milk powder
4. Use CBED to determine the polarity of a GaAs or GaN sample.
5. TEM analysis of plasmonic nanoparticle synthesis
6. SEM of different types of spider silk (SEM)
7. Something relevant to what you are doing in a research group (check with me FIRST) involving SEM/TEM.
8. A Wikipedia page on something SEM/TEM where one does not exist.
9. A detailed analysis of some higher-level experimental method such as aberration-corrected microscopy, going significantly beyond what is discussed in class.