

Project Description

This project will allow you to focus (even more) on an area of complex fluid rheology and structure that is of interest to you. The range of topics is broad, the topic that you choose can be anything that relates to complex fluid structure (characterization, modeling...), rheology (experimental techniques, novel systems, flow induced phenomena...) or a specific complex fluid system (rodlike dispersions, polymer/surfactant mixtures, liquid crystal polymers...). If you have no predetermined interests, then use the later chapters of Larson's text to find interesting topics, or build on the topic from the first project.

Objectives:

1. To gain a deeper knowledge in a specific area of complex fluid research.
2. To become familiar with the literature.
3. To apply your knowledge and extend an existing field.
4. To practice technical writing and communication skills.

Deadlines:

Week of November 12*: Project proposal due – meet with LMW.

December 3, 5: Final presentations to class.

December 10: Written report due.

*Arrange for a meeting during the week of November 12 to discuss your proposed project. Nothing formal is due, but I expect you to have chosen an area and have a rough idea of what you would like to do.

Presentation

Should be approximately 15 minutes in length followed by about 5-10 minutes of questions. You should present enough background information for people in the class. The bulk of the presentation should consist of describing what you did in your project and the results and conclusions that you reached. We will schedule these presentations to be during the class period during the week of December 2.

Paper

The paper should not exceed 5 pages in length, *including* figures and tables. Figures and tables should be included to make your point. There should be an abstract, main body of the text and list of references. The list of references does not need to be included in the 5-page limit. As usual, assume that the audience for the paper is some one with the same background as the average person in the class.

Grading:

Comprehension (40%): You must demonstrate that you understood the state of the field in the area you chose to investigate. You must clearly state the goals of your project and why they are pertinent to the field.

Critical Thinking/Originality (40%): You must demonstrate some critical thought and originality. Half of this portion of the grade will come from your definition of your project (i.e., what you propose to attack). The rest of the grade will come from what you actually achieve and learn.

Presentation (20%): The oral presentation to the class and paper weigh evenly in this part of the grade. You should be able to present your project clearly and answer questions about the work. The written report should follow the same presentation guidelines set in the first project.

Ideas for 06-610 Projects (just a few off the top of my head)

System Specific

- Estimation of viscosity of particulate suspensions based on interparticle interactions and/or electroviscous effects.
- Determination of the rheology of mixtures of spheres and transient networks.
- Calculation of the viscosity of a two-layer fluid system with different normal force behaviors.

Instrument/Technique Driven

- Determination of the importance of inertia in controlled stress rheometry of non-Newtonian fluids.
- Calculation of pressure drops and velocity profiles of fluids that exhibit a shear-induced change in viscosity.
- Comparison of the structure factors for spheres, cylinders and a string of spheres.