Mathematics and Mechanics of Soft Matter

Special Topics ME 495 (WINTER 2005)
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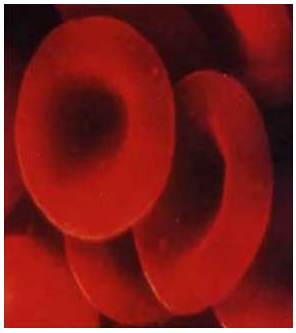
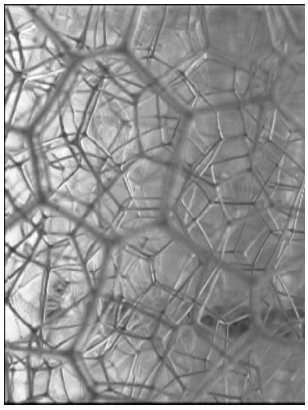
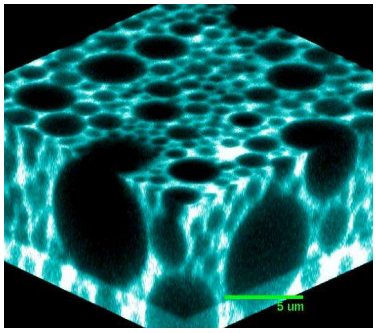


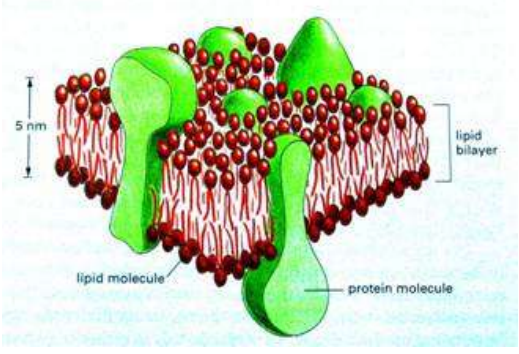


Time and location MWF 12-12:50, L160
(may be moved)



While solid mechanics has long dealt with traditional "hard" solids such as metals or amorphous materials, recent research in a variety of disciplines focuses on the understanding of *Soft Matter* - which turns out to be a harder problem in many respects. Soft matter is at the center of research in foams, suspensions, emulsions, slurries, and other composite materials. A particular focus of the course will be soft matter in a biological and bioengineering context: vesicles, cells, and other structures the living body is made up of.

Grading: homework, assignment
Enrollment will be capped at 16 students.



Key topics of the course:

- **Hard and soft matter: why the difference?**
- **Reminder of continuum mechanics**
- **Simple examples: bubbles, droplets**
- **Mechanics of networks**
- **Mechanics of membranes**
- **Lipid vesicles and red blood cells**
- **Deformation under external forces**
- **emulsions, suspensions, foams**
- **basic rheology of soft matter**