

Intermolecular Forces: From molecules to materials, molecular machines and complex behaviour.

CHE559

Objectives : Students will learn how the collective behaviours of the large numbers of molecules we encounter in practice can be understood in terms of the properties and interactions between individual molecules. Thus, the course provides a bridge between the physical chemistry of molecules and the collective behaviours addressed by biophysics, material science and cell biology. The course begins with simple descriptions of individual types of intermolecular interactions and then considers the effects of combining multiple interactions, and larger numbers of molecules. Specific types of systems students will learn to address include phase equilibria, non-ideal solutions, binding and polymerization, elaboration of higher-order structures (protein folding, virus assembly), linked equilibria (O_2 binding by hemoglobin), regulation and amplification, molecular machines (actin, light-driven ion transport, photosynthesis), and finally the origin of life.

Instructor : A.-F. Miller, CP113, afm@uky.edu

Lectures : M, W, F, 9:00 to 9:50

Prerequisites : Physical chemistry *such as* CHE 440, or equivalent, Biological chemistry, *such as* CHE 550, OR instructor's permission.

Image : Spudich (2000) Science 288:1358 Members of the rhodopsin family and their actions.

