THE DEPARTMENT OF CHEMICAL ENGINEERING presents the

Distinguished Lecturer

Marjorie L. Longo, PhD.

Department of Chemical and Materials Science

University of California, Davis

Tuesday, February 4th, 2014

10:45-11:35AM in WEB L104

Engineering of Biological Membranes: From Wine Making to Nanopatterning

Abstract:

The self-assembling nature and compositional flexibility of lipid assemblies makes them attractive platforms for study and engineering. Lipid molecules can self-assemble into a lipid bilayer, a fascinating fluid liquid crystal that is the matrix of a fundamental unit of life, the cell membrane. Therefore, self-assembled lipid bilayers are used in the lab to study real cell membranes. Some experimental models from our lab include cell membranes of wine yeasts, crowded cell membranes, and curvature variant membranes of cellular organelles. Because of the planar nature of lipid bilayers, modern laboratory tools can be applied in their study and engineering, such as atomic force microscopy, single molecule tracking, and electron beam lithography. Using principles that are familiar to chemical engineers, such as phase diagrams, obstructed diffusion, and diffusion limited vs. kinetically limited processes, the equilibrium and dynamic behavior of these systems can be analyzed and engineered.

Short Biography:

Marjorie (Margie) Longo received her bachelors and PhD degrees from the University of California, Santa Barbara in Biochemistry and Chemical Engineering, respectively. Her postdoctoral work was performed at Cornell University, Ithaca, New York. She is a Professor at UC Davis, where she has been since 1996. Professor Longo uses, develops, and combines quantitative microscopy techniques to gain knowledge of the structure, transport, thermodynamics, and mechanics of synthetic lipid bilayer membrane and monolayer systems. These serve as models of real biological membranes, and in some cases have technological applications that are easily identified (e.g. drug delivery devices). She has received awards for her research including an NSF CAREER Award, UC Chancellor's Fellowship, and Engineering Dean's Outstanding MidCareer Research Award. Recently she was elected Chair of the Biophysical Society Membranes Structure and Assembly Subgroup for 2013/2014.

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